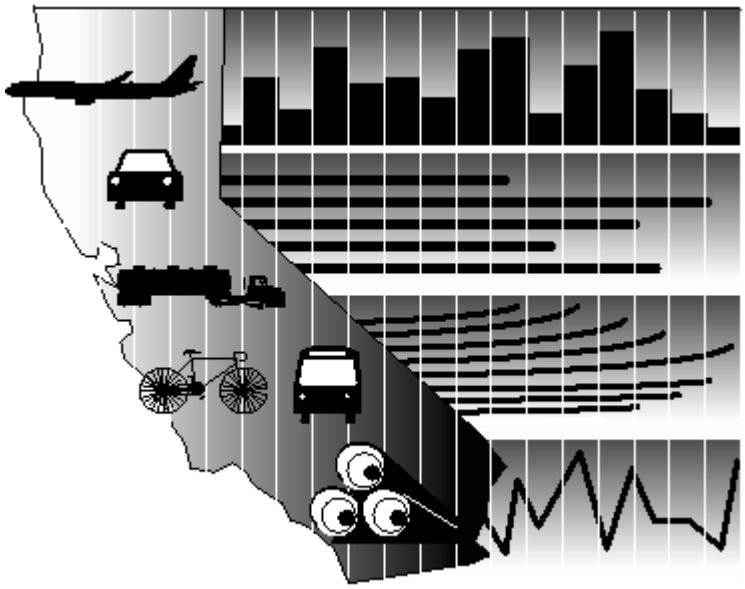
1998 California Transportation Plan

Transportation System Performance Measures

Final Report



August 1998

California Department of Transportation

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EXECUTIVE SUMMARY

The world of transportation is changing in California. More Californians must reach multiple destinations in one trip, often crossing jurisdictional and modal boundaries. Recent statistics also show that the number of trips undertaken per person is growing. Concurrently, some projections indicate that the State's population will increase by as much as twenty million new residents over the next two decades. Existing and new users are generating more complex trips that, in turn, will put pressure on our existing transportation infrastructure and services.

In the past, infrastructure expansion was the primary strategy to address growing demand. This is no longer true. Large scale infrastructure expansion projects, for a variety of reasons, are becoming prohibitively expensive. Moreover, the time it takes to plan for, design, and implement such projects has increased dramatically.

At the same time, recent studies at the international, national, and state levels have concluded that efficient transportation is directly linked to economic growth and quality of life. Clearly, we as Californians must understand these important economic linkages, addressing the changes in the transportation market place, while ensuring that the transportation system contributes positively to the quality of our communities and individual lives.

System performance measurement is one critical tool to do just that. Our traditional tools and processes were designed to address the performance of parts of the transportation system. These remain important and necessary. Transit professionals still must manage and continuously improve their bus and rail service. Highway

engineers must maintain and improve roadways and bridges. But in addition to these traditional tools, we must set the framework for a systems approach for transportation planning and decision making.

This new framework should be customer driven, should recognize the impacts of transportation on non transportation issues (and vice versa), should maximize the utility of current infrastructure and services, and should not be bound by modal and jurisdictional perspectives.

That is why the State, led by the Business, Transportation and Housing Agency (BT&H), has initiated the effort of statewide system performance measurement. The goals of this initiative are:

To develop indicators/measures to assess the performance of California's multi-modal transportation system, to support informed transportation decisions by public officials, operators, service providers, and system users.

and

To establish a coordinated and cooperative process for consistent performance measurement throughout California.

This document presents the blueprint for the State and its regional and local agencies to achieve these goals. It significantly enhances planning and decision making for California's multi billion dollar transportation industry.

The State recognizes that this type of business transformation takes time, effort, and resources. Three phases are needed to deliberately and comprehensively achieve such a transformation:

- **Design Phase** - to garner support for and to reach agreement regarding the need for this new direction. In addition, this phase identifies how transportation system performance can be measured, how it would be used, and how it will be implemented. This document represents the completion of this first phase.
- **Initial Testing and Design Refinement Phase** - to vigorously test the methodologies developed in the first phase, coordinate with regional and local agencies, and refine the design for full deployment and implementation. This phase ensures that public dollars are spent in the most efficient manner and that stakeholder agencies are in full agreement with the details. We anticipate this phase to require no more than one additional year.
- **Incremental Deployment Phase** - to incrementally implement the refined design, building on existing tools and methodologies where possible, and relying on technology initiatives where appropriate.

It is essential to emphasize that the State does not, and will not, prescribe how system performance measurement should be used in regional and local decision making. It does, though, recommend some degree of consistency among regional methodologies and an enhanced approach for informed decision making and accountability.

It is also critical to point out that the State did not develop the blueprint on its own, far from it. The Business, Transportation and Housing Agency sought policy and technical advice from public and private stakeholders through the following channels:

- **A Policy Advisory Committee (PAC)** - consisting of policy makers at every jurisdictional level, met periodically to provide input and direction to this entire effort. Major milestones of this initiative have been discussed by PAC and its member agencies.
- **A Transportation Assessment Steering Committee (TASC)** - consisting of technical representatives of many stakeholder agencies met to discuss and critique all technical aspects of this initiative. Much, if not most, of the technical progress achieved to date is a direct result of the hard work of TASC.
- **A Performance Measurement Conference** - held in late 1997 solicited input and advice from national and State thought leaders, academia, and stakeholder agencies. The recommendations of this conference

have been incorporated into all aspects of this design phase.
- **Public Forums** - held around the State to present interim findings and recommendations and encourage local agencies and the public to get involved.

The feedback and advice led to the development of general guidelines for the full implementation of system performance measurement. Some of these guidelines can be summarized as follows:

- Decision making at the regional level will remain at the discretion of regional agencies. Performance measurement aims to better inform decision makers and increase accountability.
- Some (if not many) decisions will be made outside of the performance measurement framework, recognizing that the measures developed and discussed in this report do not represent the universe of benefits and priorities of transportation investments.
- The State and regions will form effective partnerships to deploy systems, gather data, and enhance tools to enable efficient performance measurement. These partnerships will include joint responsibilities and resource sharing to maximize cost effectiveness and minimize duplication of efforts.

Two major milestones have been achieved as part of the first and critical design phase of this initiative:

- First, the desired outcomes of the transportation system were identified and defined to guide subsequent efforts (as shown in Exhibit 1). These desired outcomes reflect many (though not all) of the different priorities and goals of state, regional and local transportation agencies.
- For each outcome, one or more candidate indicators were identified for further testing and consideration (also shown in Exhibit 1). These candidate indicators are meant to reflect the degree to which the desired outcomes are achieved.

Once the outcomes and indicators are refined and finalized in the second phase of this effort, and efficient tools and methodologies implemented in the third phase, results and findings must be incorporated into established planning and decision making processes. The study team and stakeholder agencies identified the following likely linkages to these processes:

- **Long Range Planning** - State, regional and local agencies must periodically develop long range transportation plans to assess the current situation and set priorities for the future. Long range plans for regional agencies also identify the projects that reflect their priorities. System performance measurement should be incorporated into these plans and show how these projects address the desired outcomes for the region.
- **Improvement Programs** - Senate Bill 45 (SB45), passed in 1997, placed the decision making for 75 percent of the total State Transportation Improvement Program (STIP) funds in the hands of regional agencies. These agencies must submit a Regional Transportation Improvement Program (RTIP) to the California Transportation Commission (CTC) every two years. Concurrently, State agencies must submit an Interregional Transportation Improvement Program (ITIP) every two years, covering the remaining 25 percent of funding. SB45 also mandates the use of performance measurement in the development of these programs. Ideally, RTIPs and ITIPs should be driven by the existing long range plans. If these long range plans, as discussed, are at least partially influenced by system performance measurement, then RTIPs and ITIPs will as well. Submittals to the CTC would then include the degree to which improvement programs achieve desired outcomes.
- **State of the System Reporting** - The use of system performance measurement in long range planning and improvement programming informs decision makers of the likely impacts of their decisions. As such, it represents an exercise in forecasting system performance given a portfolio of investments and expenditures. However, to fully take advantage of system performance measurement, periodic monitoring of activities is necessary. A State of the System Report, developed jointly by State, regional and local stakeholders adds significant value to the overall planning and decision making process. Only by monitoring the system and understanding how previous investments contributed to its performance can

lessons be learned and decisions be truly informed. Moreover, monitoring reflects true conditions and can (should) be used to improve forecasting capabilities.

These three elements (outcomes, indicators, and decision making linkages) represent the core of this design phase. The second phase set to commence in July, 1998 will test, refine, and finalize this design. The State is committed to full implementation of this overall concept and strongly urges all involved parties to do the same. Together, this difficult, yet critical and necessary, business transformation can be attained.

Exhibit 1

DESIRED OUTCOMES OF THE TRANSPORTATION SYSTEM

Desired Outcome	Definition	Candidate Measures/Indicators
Mobility/Accissibility	• Reaching desired destiniations with relative ease within a reasonable time, at a reasonable cost with reasonable choices.	• Travel Time • Delay • Access to Desired Locations • Access to System
Reliability	• Providing reasonable and dependable levels of service by mode.	• Variability of Travel Time
Cost-Effectiveness	• Maximizing the current and future benefits from public and private transportation investments.	• Benefit/Cost Ratio • Outcome Benefit Per Cost
Sustainability	• Preserving the transportation system while meeting the needs of the present without compromising the ability of futur generations to meet their own needs.	• Household Transportation Costs
Environmental Quality	• Helping to maintain and enhance the quality of the natural and human environment.	• National & State Standards
Safety and Security	• Minimizing the risk of death, injury, or property loss.	• Accident & Crime Rates
Equity	• Distributing benefits and burdens fairly.	• Benefits Per Income Group
Customer Satisfaction	• Providing transportation choices that are safe, convenient, affordable, comfortable, and meet customers' needs.	• Customer Survey
Economic Well-Being	• Contributing to California's economic growth.	• Final Demand (Value of Transportation to Economy)

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SECTION 1 - INTRODUCTION

This section describes what performance measurement is and how this performance effort came into being

A CHANGING TRANSPORTATION SCENE IN CALIFORNIA

As California prepares for the 21st Century, the challenge confronting transportation decision makers is formidable: how does a maturing transportation system continue to meet travelers expectations given expected growth in demand and inevitable competition for scarce resources. At least four major developments must be taken into consideration:

- The contemporary California traveler, particularly commuters in a service and knowledge economy, no more represents the traveler of the fifties than today's urban landscape resembles Main Street America. Trip chaining, suburb to suburb travel patterns, and women in the workplace are but some of the phenomena changing the dynamics of transportation demand. Moreover, institutional boundaries mean little to the travelers. They expect and should be able to move through the transportation system seamlessly.
- Population growth alone (estimated by some to reach twenty million over the next two decades) promises to taunt system planners and managers as they cope with a seemingly unquenchable thirst by Californians for the mobility which enriches their lives.
- Building booms, as in the past, are no longer the obvious response to increased and shifting demand. Large capital expansion projects are too expensive to rely on as the primary strategy to address growing demand.
- The public and its representatives are starting to recognize that transportation is closely linked to economic growth and quality of life issues and, therefore, expect these linkages to be considered in transportation planning and decision making.

California, through its diverse regions, must manage the transportation system - in its entirety - as effectively and efficiently as possible, which requires that we all understand how well the transportation system is working and how it can continue to work well.

1.1 FUNDAMENTAL QUESTIONS

Transportation decision makers recognize that they must understand their customers better. However, exactly what is it that transportation contributes to Californians that enables them to enjoy the lives they do? Have we applied our resources efficiently in getting what we want while avoiding undesirable consequences? In a state as culturally diverse as California, answers to such questions are never simple. Yet such answers are necessary if decision makers facing the challenges of global competitiveness, maintaining high quality of life, and providing basic necessities to all, are to be fully informed when deciding how to invest this state's resources on transportation products and services.

How do these decision makers know that individual investment decisions yield an adequate return to California's transportation system and ultimately the State's citizens? The complexity of the transportation system makes this a very difficult question to answer. Traditionally, transportation decision makers looked at individual projects and determined a benefit worthy of the cost. Projects were often looked at in a disconnected way. Predetermined funding amounts were applied to modes without applying a system-oriented analysis, which would include highways, local streets and roads, transit, aviation, rail, navigable waterways and ports, bicycle paths, pedestrian walkways and all the related vehicles and management procedures.

1.2 POLICY PERSPECTIVE

Since the early 1990s there has been a revolutionary shift in the way that transportation planning is conducted in the United States. The passage of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) officially closed one important chapter in the development of our nation's transportation system and introduced another. The Interstate Highway System was declared complete and a new era of system management was begun. ISTEA moved away from capital intensive highway construction and moved much transportation

decision making from the federal government down to the state and local level. ISTEA also directed States and regional agencies to adopt a multi-modal systems approach to transportation planning and decision making.

ISTEA policies and directives have strongly influenced transportation policy in California in recent years. Transportation policy now very much recognizes the need to consider improved system management options before developing more costly capital expansion projects. However, decision makers are hampered by a lack of tools designed for system analysis. The California Transportation Plan in 1993 recognized this, affirmed the system approach, and called for performance assessment at the total system level.

More recently, Senate Bill 45, enacted into law in 1997 earmarked the split of authority over STIP funding but made it possible for both the regions and the State to suggest projects to be funded at either level of decision making. In other words, the State can recommend projects at the regional level and the regions, in turn, can recommend projects to be funded by the State. To do this, a consistent method of comparing projects and programs is needed. System performance measures provide some of the tools for making these comparisons.

1.3 WHAT IS PERFORMANCE MEASUREMENT?

Performance measurement is a standard management function that enables managers and other stakeholders to understand how well their efforts meet their goals and objectives. A sound performance measurement framework involves three key components:

1. a clear direction or purpose, often enunciated as a vision;
2. a simple set of metrics based on readily obtainable data; and
3. routine, readable reports.

The reason we have performance measures/indicators is to tell us where we are in terms of where we want to go. Performance measures/indicators also allow us to: benchmark or compare performance against best practices; identify opportunities for improvement; and guide the allocation of resources. The measures/indicators should be understandable to decision makers, planners, and lay people alike. They should also rely on information or data that can be obtained at a reasonable cost and with reasonable effort. Finally, these measures have to be reported regularly so that we can monitor where we are in relation to where we want to be.

- Performance measurement can assume perspectives as rich and diverse as the transportation system itself. Total system performance depends upon sub-system performance from individual modes and programs (transit, highway, inland waterway, rail, airport and shipping for example.) The system works well when all these sub-systems and their components execute well. There are different levels at which the transportation system and sub-systems can be measured:
- **System Outcome** - System outcome performance is focused on the benefits and costs accruing to society from a transportation system. Outcomes represent the values that society deems important and are often difficult to measure directly, thereby requiring indicators which can be measured using available output. Outcomes may be positive or negative. A positive outcome of a rail construction project, for example, may be to reduce traffic congestion. A negative outcome may be noise and the localization of air pollution around stations. System outcome performance is the subject of the remainder of this document.
- **Organization** - Organizational performance is the assessment of how well an agency or entity does whatever it does to provide the service it is providing. Organizational performance is linked to system performance. If every organization and service provider performs well, then there will be a positive trend in how well the system works. However, organizational performance is not addressed by this effort.
- **Individual Mode or Program** - Individual mode or program performance is clearly linked to system outcome performance. As one moves from outcome performance to individual mode performance, there is a greater need for detailed information. However, the added detail does not detract from the usefulness of each level of performance measurement. Using public transit as an example, it is important to know

how many riders are utilizing each route within the agency's domain so that line managers are able to allocate resources to meet travel demand. Data collection for such an analysis may require the use of extensive surveys and line-by-line rider counts. At the regional level, however, this level of detail is not necessary and probably would not justify the cost of collecting the information.

1.4 REPORT OUTLINE

This report culminates the first phase of a multi-phase/multi-year effort to develop a transportation system performance measure capability which will ultimately provide the answers to the questions above and enable decision makers at the local, regional and state levels to better understand how project or program investments translate into delivery critical to the customer - the users of the transportation system.

This report describes the framework the State has designed to develop outcome-based system performance measures and indicators for California. Section 2 discusses the purpose, objectives and approach for developing measures. It also identifies the three phases required for fully implementing this concept. Section 3 details the design to date including outcomes and indicators, and Section 4 identifies the subsequent steps needed to deploy and utilize these measures.


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SECTION 2 - APPROACH & PURPOSE

This section discusses the approach used to develop and begin to implement system performance measurement while incorporating the opinions and priorities of stakeholders throughout the State.

2.1 PURPOSE

The State's purpose for this system performance measurement is twofold:

To develop indicators/measures to assess the performance of California's multi-modal transportation system to support informed transportation decisions by public officials, operators, service providers, and system users.

and

To establish a coordinated and cooperative process for consistent performance measurement throughout California.

To satisfy these two purposes, the State formed a study team to involve stakeholders, review other efforts in the State and the country, identify how system performance measurement should be linked to existing decision making processes, and lay out a plan for full implementation.

2.2 STAKEHOLDER INVOLVEMENT

BT&H and Caltrans approached the development of performance measures in a variety of ways to allow for ample stakeholder and decision maker input.

A technical advisory group (Transportation Assessment Steering Committee or TASC - see Appendix D) was established to assist in detailed development of system outcomes, indicators, measures, links to decision making, data collection and terminology.

The group consisted of representatives from regional transportation planning organizations, private interest groups, the Federal government and Caltrans' programs and districts.

Through TASC, Caltrans developed the following goals for this entire initiative:

- Understand the role the transportation system plays in society.
- Focus on outcomes at the system level rather than projects and process (performance in the eye of the customer).
- Build transportation system partner relationships with clearly defined roles, adequate communication channels, and accountability at all levels.
- Better illuminate and integrate transportation system impacts of non transportation decisions.

In addition to TASC, a Policy Advisory Committee (PAC) was convened to provide overall policy guidance and to review and comment on the framework as it developed. (see Appendix D.)

To obtain additional stakeholder input, a two-day conference to specifically address transportation system performance measures was organized and presented by the University of California. Several hundred attendees from across the State representing agencies as large as the Southern California Association of Governments (SCAG) and the Bay Area Metropolitan Transportation Commission (MTC) to small, rural county governments came to Sacramento for the conference.

Government, academic and private industry representatives were gathered from across the country to discuss the topic with this wide spectrum of California transportation stakeholders. The conference helped establish a common language for developing the measures, identifying critical issues and opportunities related to development and implementation of the measures, and receiving input from a broad stakeholder community. (See Appendix F.)

To supplement the findings from the conference, a review was also conducted of existing transportation system performance measure frameworks (see

Appendices B & C) from other states and from California regional transportation planning organizations.

The review sought to highlight the variety of approaches taken and to identify areas of consistency in approach so that we might build upon what others have already accomplished. This review helped shape the findings and conclusions discussed in this report.

Public input was received from meetings held in various cities to present findings and to solicit reactions and suggestions. Formal presentations were made to several regional transportation planning organizations and to statewide transportation committees.

Finally, written discussion drafts of this report were distributed to several thousand people for review and comment. The many suggestions and comments that were received helped guide the production of this document.

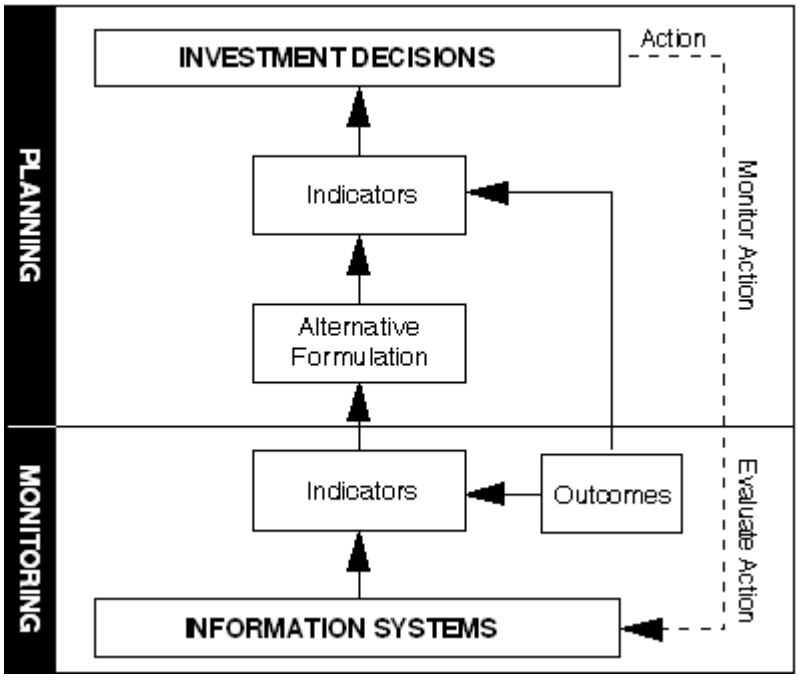
2.3 LINKAGES TO DECISION MAKING

Conceptually, planners and decision makers at the local, regional and state levels will use the system performance indicators to monitor system performance and to determine which actions will yield the best return

in terms of system benefits. This analysis and subsequent decisions will include project selection and program investment levels, such as the appropriate balance within and among expenditures for maintenance, repair, operations and additional capacity.

Exhibit 2-1 illustrates how performance measurement can be used to guide decision making by providing an assessment of existing system performance through monitoring the system using existing databases and information systems and by projecting future system performance through forecasting. The ultimate decisions are implemented as actions, monitored and fed back into the information systems to determine anew if system outcomes are being achieved.

Exhibit 2-1
PLANNING AND MONITORING PROCESS



The likely linkages to "real" planning and decision making processes include:

- **Long Range Planning** - State, regional and local agencies must periodically develop long range transportation plans to assess the current situation and set priorities for the future. Long range plans for regional agencies also identify the projects that reflect their priorities. System performance measurement should be incorporated into these plans and show how these projects address the desired outcomes for the region.
- **Improvement Programs** - Senate Bill 45 (SB45), passed in 1997, placed the decision making for 75 percent of the total State Transportation Improvement Program (STIP) funds in the hands of regional agencies. These agencies must submit a Regional Transportation Improvement Program (RTIP) to the California Transportation Commission (CTC) every two years. Concurrently, State agencies must submit an Interregional Improvement Program (IIP) every two years, covering the remaining 25 percent of funding. SB45 also mandates the use of performance measurement in the development of these programs. Ideally, RTIPs and IIPs should be driven by the existing long range plans. If these long range plans, as discussed, are at least partially driven by system performance measurement, then RTIPs and IIPs will as well. Submittals to the CTC would then include the degree to which improvement programs achieve desired outcomes.
- **State of the System Reporting** - The use of system performance measurement in long range planning

and improvement programming informs decision makers of the likely impacts of their decisions. As such, it represents an exercise in forecasting system performance given a portfolio of investments and expenditures. However, to fully take advantage of system performance measurement, periodic monitoring of activities is necessary. A State of the System Report, developed jointly by state, regional and local stakeholders adds significant value to the overall planning and decision making process. Only by monitoring the system and understanding how previous investments contributed to its performance can lessons be learned and decisions be truly informed. Moreover, monitoring reflects true conditions which can and should be used to improve forecasting capabilities.

It is critical to re-emphasize that system performance indicators are not intended as sole determinants of funding decisions, but are expected to guide such decisions by enabling policy makers to better understand how the projects or programs will contribute to better system performance.

2.4 IMPLEMENTATION PHASES

Three phases are needed to deliberately and comprehensively achieve such a transformation:

- **Design Phase** - to garner support for and to reach agreement regarding the need for this new direction. In addition, this phase identifies how transportation system performance can be measured, how it would be used, and how it will be implemented. This document represents the completion of this first phase.
- **Initial Testing and Refinement Phase** - to vigorously test the methodologies developed in the first phase, coordinate with regional and local agencies, and refine the design for full deployment and implementation. This phase ensures that public dollars are spent in the most efficient manner and that stakeholder agencies are in full agreement with the details. We anticipate this phase to require no more than one additional year.
- **Incremental Deployment Phase** - to fully implement the refined design relying on technology initiatives where appropriate and building on existing tools and methodologies where possible.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SECTION 3 - OUTCOMES & CANDIDATE MEASURES

This section identifies and defines the desired outcomes of transportation and candidate measures and indicators to reflect the degree to which these desired outcomes are or can be attained.

3.1 DESIRED OUTCOMES OF A PERFORMING TRANSPORTATION SYSTEM

The transportation programs that ultimately deliver services to foster mobility - the ability to move - are designed to produce results benefiting society, not merely movement itself. In getting the results that society values, there must be continuing vigilance to avoid unwanted side effects.

Nine transportation system outcomes have been identified that fall into two categories: (a) system effectiveness and efficiency; and (b) system responsibility.

The outcomes are interrelated and have not been prioritized. The outcome category of system effectiveness and

efficiency focuses on the key deliverables of providing reliable and cost effective mobility/accessibility and contributing to a strong economy. The outcome category of responsibility focuses on ensuring that the previously mentioned key deliverables are provided in a manner that avoids unwanted consequences. These outcomes are listed and defined in Exhibit 3-1.

Though, as some stakeholder commented, these outcomes may seem too numerous and in some cases overlapping, they do represent the different regional and interregional priorities that decision makers value. Some regions may choose to focus on only a subset of these outcomes.

The State also recognizes that some of these outcomes cannot be used consistently for both system performance monitoring and forecasting purposes. This became evident as specific measures/indicators were reviewed and evaluated and is discussed further in subsequent sections.

Exhibit 3-1
System Performance Outcomes

EFFECTIVENESS & EFFICIENCY	
Mobility/Accessibility	Reaching desired destinations with relative ease within a reasonable time, at a reasonable cost with reasonable choices
Reliability	Providing reasonable and dependable levels of service by mode
Cost-Effectiveness	Maximizing the current and future benefits from public and private transportation investments
Customer Satisfaction	Providing transportation choices that are safe, convenient, affordable, comfortable, and meet customers' needs
Economic Well-Being	Contributing to California's economic growth
RESPONSIBILITY	
Sustainability	Preserving the transportation system while meeting the needs of the present without compromising the ability of future generations to meet their own needs
Environmental Quality	Helping to maintain and enhance the quality of the natural and human environment
Safety and Security	Minimizing the risk of death, injury, or property loss
Equity	Fair distribution of benefits and burdens

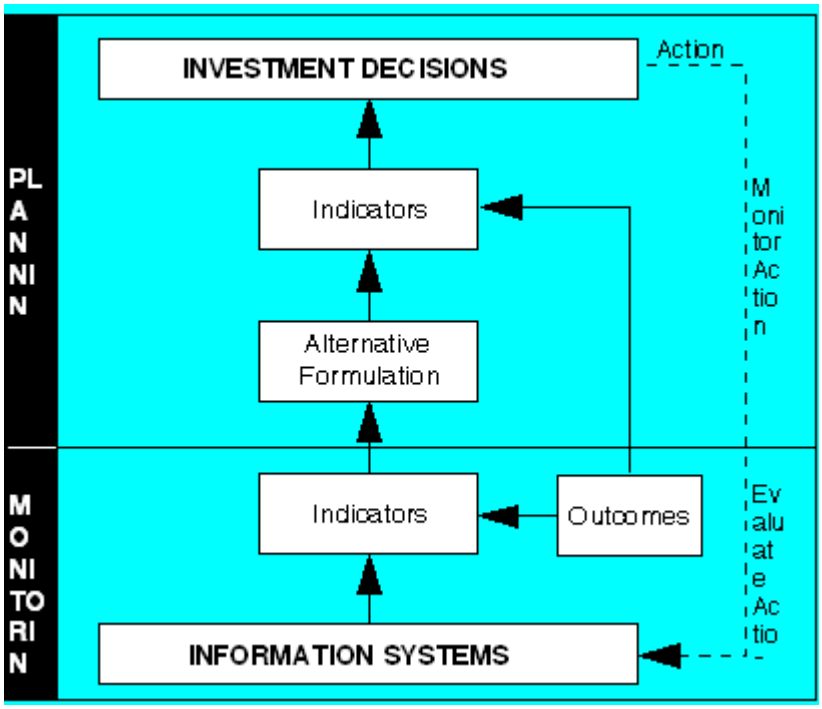
3.2 CANDIDATE MEASURES AND INDICATORS

In developing the framework for the performance measures/indicators, Caltrans used the following criteria:

- whenever possible, use existing data sources and conform to existing performance activities at California's regional transportation planning organizations;
- measures/indicators must be easy to use and be simple to understand; and
- measures/indicators, to the greatest extent possible, should be measurable across all modes.

In many instances, measures could not be identified that exactly reflect each of the identified outcomes. Economic well-being, for instance, could not be exactly measured and quantified. Therefore, in most instances, performance indicators were identified that reasonably reflect a given outcome. These indicators generally use much of the traditional transportation output information routinely collected by transportation agencies. This concept is illustrated in Exhibit 3-2 below.

Exhibit 3-2
Relationship Between System Outcomes, Performance Indicators, and Outputs



Candidate performance measures/indicators were identified to reflect system, program and project performance outcomes. The measures/indicators were selected so that they can be used for:

1. monitoring and reporting on overall system performance;
2. evaluating the performance impacts of programs; and
3. estimating the performance repercussions of large transportation projects.

The candidate measures presented in the remainder of this section are just that, candidates. These will be subject to further review in the refinement phase of the project. There are many potential measures that could be used, and stakeholders have presented many useful measures that could be implemented.

OUTCOME: MOBILITY AND ACCESSIBILITY

Definition Reaching desired destinations with relative ease within a reasonable time, at a reasonable cost with reasonable choices.

Discussion Historically, transportaiton projects have been justified on the need to improve mobility and accessibility. Trasnportatio ivestments have more direct "influence" over this outcome than others (e.g., economic well-being or equity.)

Candidate Measures

- Travel Time
- Delay (or Lost Time)
- Access to Desired Locations
- Access to the Transportation System

CANDIDATE MEASURE: TRAVEL TIME

Definition Average point-to-point travel time by market segment.

Discussion Point-to-point (sometines called door-to-door) travel time is the measure most reflective of customer priorities. However, on its own, it does not identify problems or point to potential solutions. If trends show an increaase in average travel time, transportation decision makers will want to know why and how to reduce it.

Methodology **Forecasting**: This measure is not routinely used in modeling. However, it can be estimated using traditional travel demand models by computing average trip times between origin-destination traffic analysis zone pairs.

Monitoring: This measure can be monitored using household surveys. MTC is currently evaluating ways to monitor this measure.

Example **Construction of a Dedicated Transitway**

Forecasting Agencies evaluating a dedicated transitway project can use their travel demand models to compute the impacts on average origin-destination travel times. If the models forecast a significant shift to the new transit service, congestion will be reduced and average travel times reduced. Note, however, that most agencies do not currently use this measure, and model results do not necessarily represent door-to-door travel times.

Monitoring After project implementation, actual ridership, freeway congestion, and survey results can be compared to figures obtained before implementation. If the project is successful in attracting significant ridership, the difference in travel times can be computed and reported.

Example **Passenger Rail Connection to an Airport**

Forecasting Regional travel demand models contain a mode split component that would estimate the ridership on the new rail service and the overall impact on demand on highways and access roads. Door-to-door travel time can then be estimated by computing the new zone-to-zone average travel times.

Monitoring Comparing before and after project implementation statistics will help evaluate the effectiveness of the project. These statistics could include ridership, rail schedules, and average speeds on the highway. Conversely, statistically sound surveys could also be used to quantify the impacts.

CANDIDATE MEASURE: DELAY (OR LOST TIME)

Definition Delay is the additional time spent traveling due to less than optimal circumstances.

Discussion Delay can be estimated for a given transportation facility (e.g., highway link), a corridor, or for an entire system. It is the actual travel time between two points minus the optimal time to make that same trip. This measure can identify and rank the mobility-deficient portions of the transportation system.

Methodology **Forecasting**: This measure is routinely forecasted using travel demand models. These models compute this measure for each link in the network and can aggregate the results as needed.

Monitoring: Loop detector data and transit on-time performance statistics can be used to monitor this measure by link, corridor or system.

Example **Construction of a Dedicated Transitway and Passenger Rail Connection to an Airport**

Forecasting Travel demand models compute the future impact on delay for each link in the system (transit and highway) and can derive the impact of the given project. In the case of a dedicated transitway, modelers can also experiment with different levels of bus service to gauge the impacts on ridership.

Monitoring All links can be monitored via loop detectors (to calculate link speeds) and on-time performance statistics to report on the project mobility impacts.

CANDIDATE MEASURE: ACCESS TO DESIRED LOCATIONS

Definition The ease and convenience provided by the transportation system to physically reach or access desired locations.

Discussion The fundamental purpose of the transportation system is to provide opportunities to physically reach or access desired locations. The more opportunities available to conveniently reach various social and economic activities, the greater the access. From a user perspective, the term "opportunities" covers a wide spectrum of socioeconomic needs and desires including work, education, health care and recreation. Transportation plays a large, but not the only, role in providing access to these opportunities.

Methodology Though viewed by most as a critical indicator, accessibility to desired locations may be one of the most difficult measures to forecast and monitor on a statewide system basis.
Forecasting: Can be performed via surveys and geographic analysis of household proximity based on economic and housing projections.

Monitoring: Can be done via surveys and/or geographical analysis of household proximity to selected activity centers using current demographic data.

Example	**Construction of a Dedicated Transitway and Passenger Rail Connection to an Airport**
Forecasting	To be determined
Monitoring	Accessibility increases if either distances or travel times decrease. The example projects would reduce travel times to some activity centers (e.g., airport). Surveys can be used to quantify these benefits.

CANDIDATE MEASURE: ACCESS TO THE TRANSPORTATION SYSTEM

Definition	The ease of accessing desired transportation modes.
Discussion	This measure can represent the percentage of the population that lives within a certain distance from transportation facilities. This could include distance from State highways, major bus routes or rail stations.
Methodology	**Forecasting**: Travel demand models can estimate the time it takes to access specific modes, but only from the more aggregate traffic analysis zone level. **Monitoring**: Can be done via surveys and/or geographical analysis of household proximity to major transportation facilities.
Example	**Construction of a Dedicated Transitway and Passenger Rail Connection to an Airport**
Forecasting	A dedicated transitway would probably not increase system accessibility unless new bus stations are constructed. The passenger rail project will increase the percentage of the population with access to rail. Geographic analysis would allow an estimation of such percentages.
Monitoring	Unless significant population shifts occur, monitoring will yield the same results as forecasting.

OUTCOME: RELIABILITY

Definition

The level of variability in transportation service between anticipated (based on scheduled or normal travel) and actual travel.

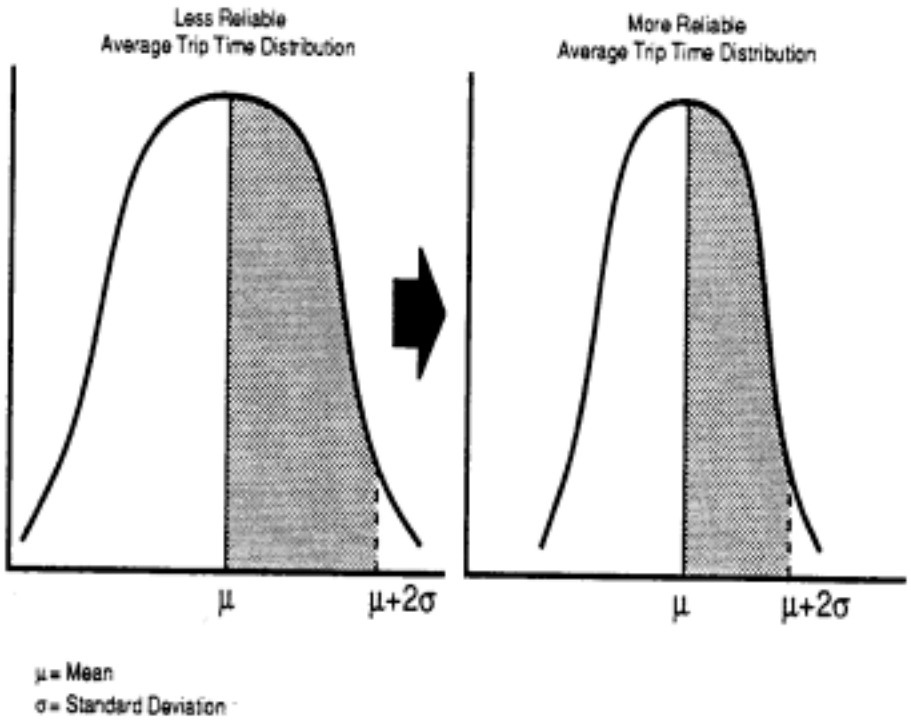
Discussion

Recent surveys show that transportation customers are in some cases willing to accept congestion during peak periods, but get increasingly frustrated if trip durations are highly variable. In transportation, variability is primarily a consequence of non-recurrent delays. On the freeways, it may reflect incidents and the time to manage them. In transit, it may reflect unanticipated breakdown of equipment (e.g., buses, rail cars). Reducing variability is therefore a function of reducing the instances of non-recurrent delays (e.g., through more intensive maintenance practices) and reducing the time it takes to resolve such delays (e.g., through faster and more systematic incident management).

More reliable systems (as shown in the exhibit below) have a "narrower" curve of average trip times. The smaller the difference is between the mean and the mean plus two standard deviations, the more reliably the system performs.

Candidate Measures

- Standard Deviation of Average Trip Time Distribution



CANDIDATE MEASURE: STANDARD DEVIATION OF AVERAGE TRIP TIME

Definition Statistical standard deviation of average trip distribution measured as a percent of the mean trip time across a segment or a corridor, by mode, over a given period of time.

Discussion This indicator measures the variability of average trip times, and therefore the variability of travel delay. By dividing the standard deviation by the mean, the non-recurrent delays are presented in relative terms.

Methodology

Forecasting: To be determined. Gathering of empirical evidence may lead to development of defensible forecasting methods.

Monitoring: Real data from sensors, loop detectors and transit schedule adherence allow monitoring of the measure and identifying project-specific impacts.

Example **Construction of a Dedicated Transitway and Passenger Rail Connection to an Airport**

Forecasting to be determined.

Monitoring Travel time statistics and adherence to schedules can be compiled before and after the project on a regular basis. The consistent analysis of average trip time distribution will identify the reliability impacts of both projects.

OUTCOME: COST EFFECTIVENESS

Definition The benefits realized from transportation compared to the cost of providing its services.

Discussion Cost effectiveness builds on the benefits measured under all outcomes and presents these benefits in relationship to the costs of transportation service delivery. Some approaches to cost effectiveness place a dollar value on each benefit, then sum up all the computed values and divide it by the total cost. Others show individual benefits without placing a dollar value and dividing it by the cost.

Cost effectiveness has also been used for some time now in determining the best strategies for preservation type investments (e.g., pavement maintenance). Almost every pavement and bridge management system used nationwide operates on the principle of financial benefit/cost optimization. Similar approaches are used in the transit industry albeit less systematically. BART recently conducted an analysis that concluded that investing in a major rehabilitation project of some of its rail cars could save the agency future costs that would be needed to replace the fleet in question.

Candidate Measures Cost effectiveness ratios such as:

- Cost effectiveness of forecasted mobility/accessibility, reliability, safety and environmental quality
- Aggregate benefit cost ratio

CANDIDATE MEASURES: COST EFFECTIVENESS RATIOS

Definition Individual outcome benefits and total dollar benefits are divided by costs.

Discussion These measures will reflect benefit cost ratios by type of benefit. A given project or program will therefore have multiple measures. Regions and stakeholder agencies can then place different values on benefits without having to translate these benefits into financial terms.

Methodology

Forecasting: The same methods for forecasting each measure for the different outcomes will be used (e.g., travel demand models for the delay measure). The cost will be forecasted as the project, program, or total cost.

Monitoring: Monitoring of benefits will also be the same as for each measure and outcome. Actual project, program and system costs are used for computing the ratios.

Example **Construction of a Dedicated Transitway and Passenger Rail Connection to an Airport**

Forecasting A dedicated transitway or a rail extension to an airport should have mobility/accessibility benefits, reliability benefits, environmental benefits, and possibly safety benefits. Dividing the benefits that can be forecasted (e.g., delay and air pollution reduction) by the forecasted cost of the project yields the forecast cost-effectiveness ratios.

Monitoring Measures that can be monitored (e.g., reliability, safety, delay) are divided by the actual cost of the projects to yield the cost-effectiveness ratios.

OUTCOME: CUSTOMER SATISFACTION

Definition Providing transportation choices that are safe, convenient, affordable, comfortable, and meet customers' needs.

Discussion This outcome would be based on survey data of major transportation markets. Many State DOTs around the country (e.g., Pennsylvania, Colorado) have started to gauge customer satisfaction through the administration of a statistically valid statewide survey. In addition, many of these surveys try to identify customer priorities by market segment.

Candidate Measures

- Customer Satisfaction Index

CANDIDATE MEASURE: CUSTOMER SATISFACTION INDEX

Definition The level to which the transportation system performance meets customer needs.

Discussion The measure would summarize customer responses and derive a customer satisfaction index. Similar indices are widely used in other areas (e.g., livability index, affordability index) .

Methodology **Forecasting**: The customer satisfaction index can be forecasted for individual projects through surveys that gauge public support. It cannot be readily forecasted for the entire system.

Monitoring: This measure can be monitored by conducting regular statistically valid regional or statewide customer surveys.

Example **Construction of a Dedicated Transitway and Passenger Rail Connection to an Airport**

Forecasting The evaluation of the potential for a transitway or for a passenger rail connection to an airport could include a survey to better gauge how well a facility might be received by the public. These surveys could also provide information about how different markets might respond to these facilities (e.g., business travelers may prefer rail transit access to an airport).

Monitoring Following the implementation of a project, surveys can be used to compare user satisfaction prior to and sometime after the project has been implemented. For example, in the case of the rail connection to an airport, passengers arriving at the airport can be asked about their access mode and their satisfaction with their travel options.

OUTCOME: ECONOMIC WELL-BEING

Definition Contributing to California's economic growth.

Discussion This outcome seeks to monitor the share of transportation related final demand in gross regional (or State) product.

Candidate Measures

- Final Demand

CANDIDATE MEASURES: FINAL DEMAND

Definition Final demand is the value of all transportation-related goods and services, regardless of industry origin, delivered to the final customer, and includes consumer and government expenditures, investments and net exports.

Discussion The measure will be used to monitor changes in transportation related economic activity. It will also show if the transportation share of economic production is rising, declining, or maintaining its current levels.

Methodology

Forecasting: Economic input output models can be used to forecast final demand. However this methodology is expensive and may need a substitute before it can be implemented statewide. However, it can be forecast periodically for the entire State.

Monitoring: At this point, there are few empirical ways to monitor economic performance. Until new methods are developed, calibrated and updated, economic input/output models can serve as a monitoring tool.

Example **Construction of a Dedicated Transitway and Passenger Rail Connection to an Airport**

Forecasting Following the construction of a transitway or a rail connection, the shift in drivers to transit will improve traffic flow along a given corridor. This in turn will improve the movement of freight and services along that corridor. In the case of a rail corridor, the shift in air travelers from the airport access roads will reduce congestion and improve airport access for freight and goods. Air freight is generally of very high value.

By estimating the cost benefits from either project, economic simulation models, such as the Regional Economic Modeling Inc. (REMI) model, can derive the impact on final demand.

Monitoring Calibrated and updated economic input output models can serve as a monitoring tool until better methods for monitoring economic data are developed for either project though the scale of the benefits may not be detectable.

OUTCOME: SUSTAINABILITY

Definition Preserving the transportation system while meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Discussion Transportation costs are a component of every household budget. If assets are not maintained on a regular basis or if transportation service costs increase above the level of inflation, household costs will increase.

Candidate Measures

- Household Transportation Costs

CANDIDATE MEASURE: HOUSEHOLD TRANSPORTATION COSTS

Definition The average percentage of household resources dedicated to transportation over a period of time.

Discussion This measure reflects total user costs as a proportion of user income. If it increases significantly over time, future generations will spend more on transportation and less on other economic activities.

Methodology

Forecasting: Project and/or program impacts on direct user costs can be calculated and divided by projected income levels. System wide projections for transportation costs (e.g., vehicle fees and registration, taxes, insurance, maintenance and fuel consumption) can be added and divided by regional or statewide projected household incomes.

Monitoring: Actual user costs are added and divided by actual household income to derive the measure and review the trend.

Example **Construction of a Transitway and** Passenger Rail Connection to an Airport

Forecasting Travel demand models will predict the shift from other modes to the dedicated transitway or to passenger rail service. By multiplying this figure by the associated fares and subtracting the costs of these riders using other modes, the net user cost impacts are computed.

Monitoring Once the project has been constructed, actual ridership and fare figures are used to compute project impacts on user costs.

OUTCOME: ENVIRONMENTAL QUALITY

Definition Helping to maintain and enhance the quality of the natural and human environment.

Discussion For the most part this outcome will not represent a departure from measuring current air quality and environmental standards such as those required by NEPA, CEQA, Clean Air Act, Water Quality Act and others. However, addressing the concept of community impacts will require the development of new measurement methods.

Changes and expansions of transportation facilities have immediate and long term impacts on the communities that they pass through or bypass. While Environmental Impact Reports document many of the impacts, the documentation is often perceived as coming too late in the project development process and not being broad enough in its consideration of maintaining or enhancing a "livable community." Phase II of this Module will explore data sources and measures that are available to describe community impacts.

Candidate Measures

- Conformity/Compliance
- Livability (not yet developed)

CANDIDATE MEASURE: CONFORMITY

Definition Environmental standards such as those required by NEPA, CEQA, Clean Air Act, Water Quality Act and others.

Discussion These measures would not represent a departure from current air quality and environmental standards such as those required by NEPA, CEQA, Clean Air Act, Water Quality Act and others.

Methodology The air quality data collected for these measures generally come from monitoring stations throughout a region. Reports can be produced on a frequent basis.

Example **Construction of a Transitway and Rail Connection to an Airport**

Forecasting The environmental impacts of the construction of a transitway or a rail connection to an airport would be forecasted by estimating the reduction in mobile emissions (e.g., using the ARB Emfac7 model).

Monitoring Environmental, particularly air quality, measures are routinely used to monitor changes in system performance.

OUTCOME: SAFETY AND SECURITY

Definition Minimizing the risk of death, injury, or property loss.

Discussion Safety addresses the prevention of physical injury and property damage directly related to transportation. Security reflects the prevention of actual and perceived threat of criminal harm related to transportation services.

Candidate Measures

- Accident Rates
- Crime Rates

CANDIDATE MEASURES: ACCIDENT AND CRIME RATES

Definition Rates of change in accidents, fatalities, injuries, and property damage. Rates of crime related to transportation services.

Discussion Accident rates are measures of how well the system performs in terms of human safety. Changes in any of these measures result in relatively large economic savings to the region and to the state since accident related public costs (e.g., police, fire, ambulance, and disability payments) comprise a significant percentage of local expenditures.

Methodology **Forecasting**: Forecasting the future incidence of accidents and fatalities is difficult and is not generally performed. Regional travel demand models do not forecast this measure.

Monitoring: Accident rates are used to monitor system performance at the operator, regional and state levels, but in the case of highways, can also be developed at the corridor and segment level. These rates are commonly compiled by state and federal regulatory agencies and include several modes such as freight rail carriers and the trucking industry.

Example	**Construction of a Transitway and Passenger Rail Connection to an Airport**
Forecasting	Forecasting is not generally performed for accidents or incidents.
Monitoring	The California Highway Patrol (CHP) monitors accident rates on State highways, and the Federal Transit Administration (FTA) tracks incidents and injuries for most large transit systems. In the case of collisions on a transitway, for example, CHP would be the lead agency for monitoring the incident rate, but the local transit operator would maintain information to provide to the FTA. However, the transit report to the FTA is performed annually and is reported on a modal basis, not by individual route.

OUTCOME: EQUITY

Definition	Fair distribution of benefits and burdens.
Discussion	Transportation investments should be made in a manner that a disinterested, objective observer would consider "fair". "Social Equity" in transportation is a concept that means the needs of the disadvantaged be adequately considered in transportation policy and infrastructure development.
Candidate Measures	Income Group Share of Mobility Benefits

CANDIDATE MEASURE: INCOME GROUP SHARE OF MOBILITY BENEFITS

Definition	The distribution by income quintile of forecast benefits in time saved.
Discussion	This measure will evaluate changes in travel times by income group. Data for the indicator can come directly from travel demand models, actual and forecast population, and household surveys such as the American Community Survey that will follow the year 2000 Census.
Methodology	**Forecasting**: This measure is not used in forecasting, but may in some instances be estimated. Population projections are not typically broken down into quintiles. **Monitoring**: The measures can be used for monitoring system performance.

Example	**Construction of a Dedicated Transitway and Passenger Rail Connection to an Airport**
Forecasting	The construction of a transitway or a new rail system could reduce travel times for low income populations.
Monitoring	This measure can be used for monitoring system wide performance. As discussed for other measures, data can be collected from currently available sources from regional planning agencies, from household surveys or from other survey data such as that to be provided by the American Community Survey.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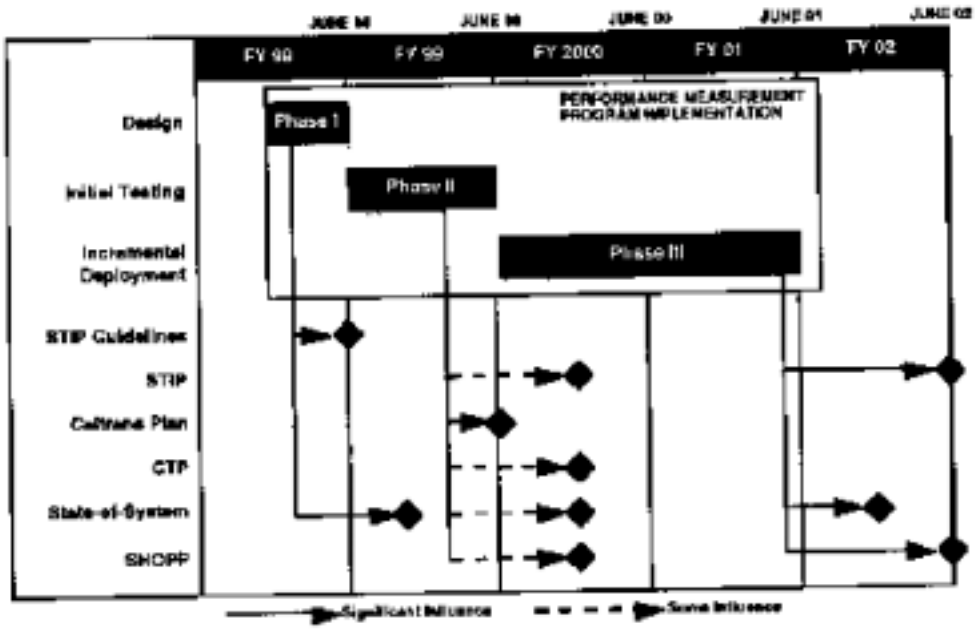
SECTION 4- IMPLEMENTATION

This section describes the next steps needed to fully implement performance measurement and incorporate it into planning and decision making processes.

The implementation schedule and how it influences important products and milestones is presented in Exhibit 4-1. Note that the implementation will be deliberate and incremental in nature.

The first State Transportation Improvement Program (STIP) that would be significantly influenced by system performance measurement is the 2002 STIP. However, to the extent possible, earlier products should be at least partly influenced by it.

Exhibit 4-1
IMPLEMENTATION SCHEDULE



4.1 STIP GUIDELINES

Senate Bill 45 (SB45) requires the California Transportation Commission (CTC) to adopt guidelines for the STIP process.

The bill states (in part) that *"(a) The department, in cooperation with the commission, transportation planning agencies, and county transportation commissions and local governments, shall develop guidelines for the development of the state transportation improvement program." and "(b) The guidelines shall include, but not limited to, all of the following: .... (5) Objective criteria for measuring system performance and cost-effectiveness of candidate projects."*

Clearly, the performance measurement development effort will influence the development of the STIP guidelines. Given that this effort has already included an extensive amount of coordination and consultation between Caltrans and stakeholder agencies, it is fair to assume that some of the conclusions presented in this report will be incorporated into the proposed STIP guidelines for CTC consideration. Caltrans will reconstitute TASC with even greater local/regional participation to guide the STIP guidelines development effort.

Again, the intent of BT&H and Caltrans is not to prescribe which criteria and/or indicators are the most important for Regional Transportation Improvement Program (RTIP) and Interregional Transportation Improvement Program (ITIP) development. Rather, it is to develop a common framework for measuring system performance and incorporating it into planning and decision making processes at all jurisdictions. This common framework will take the following design considerations into account:

- Decision making at the regional level will remain at the discretion of regional agencies. Performance measurement aims to better inform decision makers and increase accountability.
- A common performance measurement framework provides an opportunity for the State and regions to potentially influence each others' decisions. A region, for instance, could "nominate" and "lobby for" an inter-regional project by presenting its forecasted performance benefits.
- Some (if not many) decisions will be made outside of the performance measurement framework, recognizing that the measures developed and discussed in this report do not represent the universe of

benefits and priorities of transportation investments.

- Regions and the State may have different priorities. Though all outcomes are important at both levels, the relative priorities of outcomes will be decided at each level. The State will not dictate priorities for the regional level.
- Regions will communicate the forecasted performance impacts of their transportation long range plans (i.e., RTPs) and programs (i.e., RTIPs).
- On a regular basis (e.g., every two years), regions will also report the real regional system performance as observed through their monitoring activities and systems.
- The State will also communicate the forecasted performance impacts of the ITIP and report on actual inter-regional system performance on a regular basis.
- The State and regions will form effective partnerships to deploy systems, gather data, and enhance tools to enable efficient performance measurement. These partnerships will include joint responsibilities and resource sharing to maximize cost effectiveness and minimize duplication of efforts.
- Over time, this continuous effort should improve regional and inter-regional forecasting capabilities.

At the present time, the law requires Caltrans to submit its draft guidelines to the CTC by February 1, 1999. The CTC is to finalize and adopt the guidelines by May 1, 1999.

4.2 PHASE 2 WORK PLAN

Phase 2 of the performance measurement initiative seeks to "stress test" the concepts, methodologies, and tools needed for monitoring and forecasting transportation system performance. It is an admission that many of the candidate indicators are new and untested. (An example of a preliminary proof of concept testing of the Reliability Outcome is provided in Appendix G.) Moreover, the cost of truly using these indicators state-wide must be reasonable before the State can commit to full implementation. Finally, the candidate indicators must leverage existing tools and data sources to the extent possible.

Several efforts will be conducted during the next year in cooperation with regional, county, and local transportation agencies. These efforts include the following tasks:

1. **Research and test the applicability of the candidate indicators identified for the transit modes.** Candidate indicators developed during the design phase will be tested for transit applicability and ease of data gathering and calculation.
2. **Research and test the applicability of the indicators identified for the freight transportation market.** Candidate indicators developed during the design phase will be tested for freight transportation market applicability and ease of data gathering and calculation.
3. **Test economic performance measurement.** One of the most difficult and controversial issues relates to the methodology proposed to measure the "economic well-being" outcome. Research is needed to evaluate the reasonableness of the candidate measures identified and perhaps the development of others that may better meet the objectives of system performance measurement.
4. **Develop and evaluate operations prototypes.** Caltrans has already started an effort to develop a prototype in Orange County that monitors some aspects of system performance while also providing real-time operations data for system management. This prototype will be evaluated for applicability for statewide deployment.
5. **Review major travel demand model efforts statewide.** Some work should be undertaken with metropolitan planning organizations, regional transportation planning agencies, and congestion management agencies to review travel demand model assumptions (e.g., economic forecasts) and to develop a framework for attaining increased consistency among methods and assumptions. The current standing committee on modeling is likely to be the best forum for such efforts.
6. **Continue coordination and consultation.** The State will continue coordination through TASC or other forums and review related regional and congestion management agency efforts. Caltrans will also initiate discussions with other State agencies such as the Employment Development Department to build broader

and more far reaching consensus and to get access to non-transportation data.

7. **Design a State of the System Report.** The State will cooperatively design a State of the System Report for periodic reporting of the results of monitoring system performance and target February 2000 as first release based on 1998 year data.
8. **Hold a second conference on performance measures.** The State will hold a second conference on performance measures to provide an update on the progress achieved, review other development efforts in California and elsewhere, solicit feedback from its stakeholders, and help develop the necessary tools for full deployment.
9. **Review current tool capabilities.** State tools, such as the Highway Performance Monitoring System (HPMS), the Life Cycle/Benefit Cost Model (LCBM) and the Intermodal Transportation Management System (ITMS) will be reviewed in terms of applicability to system performance measurement. Other tools, at the regional, county, or local government levels will also be identified and evaluated to the extent possible.
10. **Develop final design and implementation plan.** All the conclusions of the proof-of-concept efforts will be summarized and a plan for Phase 3 deployment and implementation will be developed accordingly.

Phase 2 efforts will take up to one year. This may sound overly ambitious, but this time frame is critical in order to be aggressive and move from a hypothetical design and testing mode into an implementation mode.

4.3 PHASE 3 STRATEGY

Once Phase 2 is completed, incremental deployment and implementation will begin. The strategy for deployment and implementation can not be fully defined before Phase 2 findings and conclusions are available. However, overall strategic considerations will include:

- The State and regions are deploying a number of technology initiatives for operational and system management purposes. These intelligent transportation system (ITS) initiatives will also produce a wealth of information. It will be critical to access and leverage these data to minimize the cost of implementing performance measurement.
- Part of the recently authorized Transportation Equity Act for the 21st Century (TEA21) directs federal transportation agencies to conduct research related to outcomes identified in states' performance measurement efforts. This research may find methodologies and tools that could prove useful for the implementation phase. California must leverage the results of these studies and incorporate the latest in tools and methodologies where appropriate.
- The implementation phase must be iterative in nature, starting with tested and proven approaches and gradually adding capabilities to its tool set.

It is expected that full implementation will require two years. However, results of the early stages of this phase will be useful and valuable to all concerned parties.

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APPENDIX A
CRITICAL TERMS

Performance measurement, as many other areas, is often fraught with misunderstanding attributable to differing

understandings of terms. For the purpose of the discussion in this paper, the following meanings are intended:

accessibility
The opportunity for and ease of reaching activity sites. The fundamental product and intended purpose of the transportation system is the provision of the opportunity of people and goods to physically reach or access desired locations. The more opportunities to readily or easily reach various social and economic activities, the greater the access. (Access is also often provided through telecommunications rather than physical travel. For the purposes here, access is applied only to physical travel.)

customer/system user/traveler
The individual or organization actually traveling on or sending items on the transportation system.

decision maker
Any individual, organization or group with the authority to choose how transportation funds will be allocated or what form the transportation system will take. Includes federal, state, regional, local and mode specific decision making and local land use authorities. When appropriate, can also address the general public as decision makers.

market segment
Users of the transportation system that share common trip purposes, destinations or other features. For example: commuters, weekend recreational travelers, farm product shippers, and overnight package delivery services would each be a separate market segment. The same individuals or firms could be found in more than one market segment and market segments can overlap.

measure & indicator
The terms measure and indicator are often used interchangeably. Both refer to the quantification of a characteristic of the transportation system. Measures and indicators show the degree to which an outcome or output has occurred and to what level a performance objective has been achieved. For example: travel time could be measured to indicate average door to door travel times for commuters traveling within a region, and that measurement compared to a performance objective. There can be many different measures and indicators applied to the same outcome. They differ in that measures are actually measuring a quantity directly related to an outcome. Indicators are not direct measures of outcomes but surrogates which usually measure output, with output measures serving as the indicator.

mobility
The ease of traveling or moving between two points and a key determinant of access. Mobility refers to the potential for movement or the ability to travel from point A to point B, and implies both a means (vehicle) and a way (route, path, or line). As mobility is increased, as more destinations can be reached or more means and ways are available, access tends to be improved. As mobility is decreased, as it becomes more difficult or expensive to travel, access tends to become increasingly restricted. An urban core may have low mobility due to congestion, but have high access potential due to the concentration of desirable sites. A rural area may have high mobility in that travel is free flow, but desired locations may be distant and thus access potential is low.

monitoring
The tracking or cataloging of the actual functioning of the transportation system over time. Usually involves tracking system output. Identifying how much movement is occurring, at what speed, at what time, at what cost, etc. This information may be applied to develop the performance indicators or may be an application of the indicators (i.e. the indicators themselves can be tracked.)

outcome
A consequence or condition resulting from the construction, operation or use of the transportation system. Outcomes may be desirable or undesirable and quantifiable or not quantifiable. Outcomes can apply to the

entire State down to
an individual facility such as a port, transit station or roadway intersection. Desired outcomes are used to describe desired consequences, conditions or benefits. For example: a desired outcome of the operation of a bridge could be to provide access between two counties. An undesired outcome of the construction of the bridge might be the destruction of wetlands.

output
Measured quantity of movement or other measurable result generated by the construction, operation or use of the transportation system. Outputs can be desirable or undesirable. Some outputs are used to determine the degree to which outcomes have occurred. For example: an output of the operation of a bridge could be the passage of 2,000 vehicles per lane per hour, a quantity which may indicate the degree to which a desired outcome of providing access between the two sides of the bride has been achieved. An undesired output could be the occurrence of one injury crash per million vehicle crossings.

performance objective
A desired, measurable output level that relates strongly to a desired outcome. For example: a performance objective of the operation of a bridge might be the passage of 2,500 people per lane per hour during peak commute periods. An actual output would be the measurement of how many people actually traveled per lane per hour during the peak commute period. The desired outcome might be increased access to employment locations on one side of the bridge from the other.

reliability
The likelihood of expectations being met. A characteristic of the transportation system most often involving the predictability of time and cost. In regard to time: being able to regularly and dependably predict travel time. Avoidance of unexpected or non-recurrent delay. Reliability versus variability. In regard to cost: being able to regularly and dependably predict travel cost or transportation system operations and maintenance costs. Where travel time is unexpectedly extended, additional monetary travel costs may be incurred by individuals or firms. Monetary costs for travel may be further affected where transportation equipment or facilities do not operate in a reliable manner: equipment or vehicle
break downs, pavement failures or landslides as compared to the reliability of scheduled maintenance costs.

transportation system
The entirety of all facilities, equipment, vehicles, transfer points, and transportation services, public and private, across all modes, functioning together to serve a multitude of individual purposes in the transport of people, goods and services.

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APPENDIX B
PERFORMANCE MEASURES USED BY REGIONAL AGENCIES IN CALIFORNIA

Listed below is higher order transportation system performance measurement related information for the Metropolitan Transportation Commission (MTC), Sacramento Area Council of Governments (SACOG) and Southern California Association of Governments (SCAG). The organizations' performance measurement frameworks and details are still under development at each of the agencies and so this information is dynamic and does not represent any final performance measurement approaches by any of the agencies. A more thorough

review of California agencies, including Congestion Management Agencies will be conducted in Phase II of the Performance Measurement development effort.

There appears to be substantial similarities among the agencies regarding performance measurement categories identified as outcomes by Caltrans. Within these categories, there is also agreement about desired end results and particular indicators. For example, each agency addresses mobility, and where indicators have been proposed, each agency identifies time as being the key indicator.

There is also variation among the agencies. The organizations sometimes focus on the same category in different ways, and there are areas of emphasis that are not commonly held. Several of the categories that have been identified as important (equity, sustainability and livable communities) have proven to be particularly difficult to find indicators for. Also, while MTC focuses on performance measures for monitoring, SCAG emphasizes modeling them, and Caltrans is attempting to address both monitoring and forecasting. There is an expectation that eventually, as their performance measurement frameworks mature, each organization will address monitoring, modeling and forecasting in ways that are compatible with what is being done at the other organizations.

It does not appear that the differences among the performance measurement frameworks indicate seriously conflicting approaches. Rather, it seems that each organization is trying to examine a handful of common transportation system consequences, and is approaching the task from different starting points and at different scales. The agencies working cooperatively will help to ensure that the collection of system performance measurement approaches in California are complementary among the organizations, leaving room for detailed variations to suit the needs of each organization.

MTC

MTC is working to identify customer-oriented measures of mobility and system reliability for monitoring purposes. Initially, MTC will monitor travel time and is now examining ways to gather detailed data which may focus on travel markets such as commuters, transit dependents and freight movement. The focus on travel time is in congruence with the SCAG and Caltrans approaches to measuring mobility and reliability, though MTC is attempting to monitor actual travel time while SCAG currently relies on models to determine travel time.

This monitoring effort is not, at this point, explicitly linked with MTC's five goals as detailed in the 1994 Regional Transportation Plan. Nonetheless, those five goals are oriented to the same considerations as are many of the SCAG and Caltrans performance measure outcomes and the SACOG goals for the I-80 Corridor Study. The five plan goals include 1) improve mobility for persons and freight; 2) promote equity for system users; 3) enhance sensitivity to the environment; 4) support economic vitality of the region; and 5) support community vitality of the region.

From the Metropolitan Transportation Commission 1994 Regional Transportation Plan Policy Element:

Five goals define the broad, desirable effects of the transportation system:

Goal 1: Improve Mobility for Persons and Freight

- The ability to move with a reasonable degree of ease and predictability on a Metropolitan Transportation System (MTS) in the Bay Area is key to the region's economy and quality of life. The MTS should be the focus of the many partner agencies who operate it.

Goal 2: Promote Equity for System Users

-

Equitable access to the region's transportation system, and the decision-making process that governs it, should be provided for all persons.

Goal 3: Enhance Sensitivity to the Environment

- The environmental impacts, both short- and long-term, of transportation decisions should be fully analyzed and considered, and adverse impacts mitigated whenever possible.

Goal 4: Support Economic Vitality of the Region

- The relationship between a productive regional economy and the ability of the transportation infrastructure to move individuals, commodities, and information should be recognized and reinforced.

Goal 5: Support Community Vitality of the Region

- Transportation improvements should be used to help create more livable communities and enhance the Bay Area quality of life.

SACOG

SACOG has begun to examine potential measures that may be used for updating the organization's Metropolitan Transportation Plan. In addition, SACOG is applying performance measures to the Interstate 80 (I-80) Corridor Study. The Study identifies several goals with corresponding objectives and lists of measures. Each of the goals and objectives is complementary with performance measurement outcomes being developed by SCAG and Caltrans and MTC's Plan Goals.

From the Sacramento Area Council of Governments Interstate 80 Corridor Plan Working Paper:

Goal 1: Maintenance & Operations; effectively manage the existing transportation system in the corridor recognizing that we must protect existing investments and maximize use of the existing system.

- Objective 1A: improve the useful life of the transportation system in the corridor.
- Objective 1B: improve efficiency of the existing transportation system in the corridor.

Goal 2: Mobility; improve mobility within the corridor particularly during peak commute and recreational periods, emphasizing economic development and safety.

- Objective 2A: improve access within the corridor.
- Objective 2B: effectively manage congestion within the corridor.
- Objective 2C: improve travel options within the corridor.

Goal 3: Air Quality; to reduce mobile-source emissions leading to the achievement of state and federal air-quality goals.

- Objective 3A: achieve ambient air quality standards in the corridor.

SCAG

SCAG's performance measurement framework is being implemented in its initial form and is undergoing further development. The 1998 Regional Transportation Plan used performance measures to select projects and programs to meet mobility, financial, and air quality requirements. The Plan recommends public and private

approaches to address mobility, economic, social and environmental goals and objectives.

While the SCAG performance measures contain differences from those under development by Caltrans, there is substantial agreement as to the major performance measurement categories and also among many of the indicators. In many instances SCAG and Caltrans identify the same outcomes and define them in the same way.

But there are two important differences between the approaches. First, SCAG takes performance measures a step further than Caltrans by developing detailed performance objectives and indicators, such as work opportunities within 25 minutes. Second, SCAG uses modeling and forecasting as the primary data analysis tools. Caltrans intends to apply modeling and forecasting to performance measurement, but will also have a strong focus on monitoring.

From the Southern California Association of Governments' Draft 1998 Regional Transportation Plan Goals, Objectives and Policies:

Mobility

- Transportation systems should meet the public need for improved access and for safe, comfortable, convenient, and economical movements of people and goods.
- Indicators: average work trip travel time in minutes; PM peak highway speed; percent of PM peak travel in delay (all trips)

Accessibility

- Transportation systems should ensure the ease with which opportunities are reached. Transportation and land use measures should be employed to ensure minimal time and cost.
- Indicator: work opportunities within 25 minutes

Environment

- Transportation systems should sustain development and preservation of the existing system and the environment (all trips).
- Indicator: meeting federal and state standards

Reliability

- Reasonable and dependable levels of service by mode (all trips).
- Indicator: transit and highway

Safety

- Transportation Systems should provide minimal risk, accident, death and injury (all trips).
- Indicators: fatalities per million passenger miles; injury accidents

Livable Communities

- Transportation Systems should facilitate livable communities in which all residents have access to all opportunities with minimal travel time (all trips).
- Indicators: vehicle trip reduction; vehicle miles traveled reduction

Equity

- The benefits of transportation investments should be equitably distributed among all ethnic, age, and income groups (all trips).
- Indicator: low-income (household income $12,000) share of net benefits

Cost-Effectiveness

- Maximize return on transportation investment (all trips).
- Indicators: net present value; value of a dollar invested

Market Segmentation

As identified below, each of the agencies is considering the application of market segmentation within their performance measurement efforts. Potential Caltrans market segments are included for comparison.

Caltrans

- Commute
- Recreational
- Freight - regional
- Freight - interregnal

MTC

- Commuters
- Non-work trips, urban
- Non-work trips, suburban
- Persons dependent on transit
- ADA
- Businesses, Shippers and Truckers

SACOG (For I-80 Corridor)

- Commute
- Recreational
- Freight and/or Goods Movement
- Transit (i.e., light rail, heavy rail, commuter rail, or buses
- Non-motorized

SCAG

- Commute
- Freight (possibly)
- Emergency Services (possibly)

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APPENDIX C

PERFORMANCE MEASURES USED IN OTHER STATES

This is not a comprehensive list of transportation performance measures used in every state. Several states were selected for examination because they were purported to be fairly advanced in their development and use of performance measures.

Many of the state transportation performance measurement approaches under development in other states appear to focus primarily on measuring outputs versus examining how well system outcomes are being achieved. An output is a measurable result generated by the construction, operation or use of the transportation system. An outcome, on the other hand, is a consequence of the transportation system. Outputs are used to measure outcomes.

It is common to have performance measurement of the transportation system mixed with organizational performance measurement. Even at the federal level, there is not always a clear distinction between an individual agency's performance and how well the nation's transportation system is meeting national needs. At the direct service provider level, measures are applied throughout the organization to, among other purposes, track work units and even individual employees. These many different types of performance measures use similar terminology, but with different meanings.

Summaries of four state transportation measurement frameworks, representing Florida, Minnesota, Oregon and Texas, are provided in Appendix C. These states were selected because each represents a different approach to performance measurement.

Florida has developed a multi-departmental Performance Accountability System intended to inform the public as to how well the state's departments are doing their jobs as defined by the departments' strategic plans. Minnesota has a strong Department of Transportation organizational performance measurement orientation, with imbedded system measures. Texas focuses on a handful of key transportation measurement categories with many indicators under each, and
Oregon's transportation measures are tied to a larger statewide multi-departmental and societal benchmarking strategy.

Florida

In Florida, the Government Performance and Accountability Act requires that state agencies submit performance-based budget requests, programs, and performance measures. Each agency has to identify measurable objectives that will be used to judge the achievement of the goals and objectives in its Agency Strategic Plan. From this, a Performance Accountability System has been designed to link strategic planning, budgeting and performance measures to clearly demonstrate how agencies are accountable to the citizens of Florida for the agencies' outcomes.

In regard to applying the Performance Accountability System to the state's transportation system, the key link is the Department of Transportation strategic plan. The goals and objectives identified in the strategic plan, and how they relate to transportation system outcomes, will determine if the performance measurement system is examined on a societal outcomes basis or an organizational output basis. A review of the 2020 Florida Transportation Plan shows that the plan goals focus on societal issues such as safety, protecting the investment already made in the system, economic competitiveness, mobility, environment and community values. Each has objectives for attainment of these goals. The objectives are framed largely in terms of outputs.

Minnesota

Minnesota has developed what it refers to as a Family of Measures. The family includes a mix of measures including input, process, output, outcome, financial, customer, learning and growth measures. The measures

look at the DOT from the division, office, district, workgroup, and employee performance levels. System output measures are intertwined and not always easy to identify. The Family of Measures is intended to give facts on which to base key investment decisions; better enable customers and stakeholders to communicate with the DOT about choices that are made; guide employees and partners in focusing
resources on the most important work; and define gaps between expectations and performance and help target process improvement areas so that better products and services can be delivered.

Oregon

It is the budget policy of Oregon to create and administer programs and services designed to attain societal outcomes such as the Oregon Benchmarks and to promote the efficient and measured use of resources. State government shall: (a) allocate resources to achieve desired outcomes; (b) express program outcomes in measurable terms; and (c) measure progress toward desired outcomes.

Oregon has a current list of 92 benchmarks that include transportation related factors as well as numerous other societal considerations. Within the DOT, the benchmarks are examined for applicability and then addressed accordingly. Thirteen draft performance measures have been developed for the DOT for use by the Transportation Commission. Seven of the measures are identified as system outcome or public perception measures: 1) pavement condition, 2) bridge sufficiency, 3) VMT per capita, 4) alternate modes, 5) fatalities, 6) urban congestion, & 7) customer satisfaction.

Texas

Under the Texas Transportation Plan and Strategic Plan, the state has developed a system of performance measures intended for use by senior management, divisions, districts, MPO planners and key modal transportation system planners. Texas has identified four key performance measurement categories: mobility, safety, affordability and environmental impact. Within the categories are specific indicators. Texas also has an extensive list of measures which examine a multitude of issues which can be organized under the hierarchy of the four key measures.

Comparison Tables

The tables below summarize how Minnesota, Texas and Oregon are addressing transportation performance measurement. For ease of comparison with the Caltrans performance measurement outcomes, the other states' measures are categorized under the concepts of mobility, accessibility, reliability etc. This categorization is for convenience only, to show that the same general concepts are being examined in many states. *Though addressed in the text above, information for Florida is not included in the tables below due to the unavailability of detailed indicator information.

Mobility

Minnesota Time/Directness: a predictable travel time for length of trip is maintained so that customer expectations are met.

· Indicator: freeway miles congested in AM and PM peaks.
· Indicator: Average travel time, distance and speed.

Texas
Mobility
· Indicator: average trip time on each system segment for each mode.
· Indicator: average traffic travel speed on each segment.

Oregon Urban Congestion

· Indicator: percent of limited access urban highway miles that are heavily congested during peak hours.
· Indicator: Percent of urban interstates with a volume service flow ratio greater than 0.7 (moderate congestion). Revised to 0.8 (heavy congestion) in 1995.

Accessibility

Minnesota Access/basic levels of service: services are provided to meet personal travel and shipping needs.

· Indicator: miles/trips eliminated by telecommuting.
· Indicator: percentage of targeted audiences with satisfactory transit options.
· Indicator: percentage of major commodities moved with more than one modal choice.
Indicator: load posted bridges by functional class; miles trunk highway with spring weight restrictions by functional class.

Reliability

Minnesota Time/Directness: a predictable travel time for length of trip is maintained so that customer expectations are met.

· Indicator: freeway miles congested in AM and PM peaks.
Indicator: average travel time, distance and speed.

Cost-Effectiveness

Minnesota Transportation investments will yield the highest possible economic return to the region, tempered by an evaluation of community values and social impacts.
Indicator: major investments that have conducted benefit/cost analysis.

Customer Satisfaction

Minnesota Customer perceptions of system performance and public values/issues.
· Indicator: satisfaction with transportation systems which impact the environment.
· Indicator: satisfaction with involvement in pre-project planning (informed consent).
· Indicator: quality of ride - a smooth trip that meets customer expectations is maintained.
· Indicator: condition of infrastructure - an infrastructure that meets customer expectations is maintained.
· Indicator: customer satisfaction with travel delay information (winter driving, construction, congestion).

Oregon Index of surveyed customers' satisfaction ratings in four areas of ODOT service: providing transportation planning for future needs; maintaining roads, bridges, and rest areas; constructing facilities to meet needs; DMV services.

Economic Well Being

Minnesota Transportation investments will yield the highest possible economic return to the region, tempered by an evaluation of community values and social impacts.

Environmental Quality

Minnesota Mn/DOT is a proactive responsible environmental steward.
· Indicator: residents in incorporated areas exposed to freeway and expressway noise exceeding standards.

· Indicator: wetland acres impacted and replaced.
· Indicator: chemicals (salt, herbicides...) used on roadways by Mn/DOT.
Texas
· Indicator: Total quantity of pollution generated per unit of traffic throughput, i.e., air, water and noise pollution for each mode.
Oregon · Indicator: percentage of Oregonians living where the air meets government ambient air quality standards.
· Carbon dioxide emissions as a percentage of 1990 emissions.

Safety & Security

Minnesota Incidents and accident rates are minimized to Mn/DOT's current and potential ability to influence infrastructure, partnerships/education, full range of solutions and driver behavior.
· Indicator: motor vehicle crash and fatality rates by road category.
· Indicator: hazardous materials incidents involving transport.
· Indicator: motor vehicle crash and fatality rates by crash type.

Texas
Safety
· Indicator: property damage, injury and fatal accidents per million vehicle-kilometers.
· Indicator: property damage, injury and fatal accidents per million passenger-kilometers.
· Indicator: property damage, injury and fatal accidents per million freight megagram-kilometers.
Oregon · Indicator: Transportation system fatalities per 100 million VMT.

Cost

Minnesota Value and service is optimized with low system cost to the user.
· Indicator: transit operating costs per vehicle mile.
· Indicator: transportation costs associated with each major commodity.
Texas Affordability
· Indicator: fuel consumption.
· Indicator: fare cost per passenger-kilometer for each mode.
· Indicator: vehicle maintenance (wear-and-tear) cost per vehicle-kilometer.

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APPENDIX D - COMMITTEE ROSTERS

POLICY ADVISORY COMMITTEE (PAC)

The PAC was formed by Caltrans to engage in policy discussion of how both the Goods Movement and Performance Measures projects should proceed. The PAC also provided guidance regarding specific outcomes and the general purposes for which performance measures would be used.

Sam Agpawa Environmental Protection Agency
John Barna Business Transportation & Housing Agency

Dan Beal Automobile Club of Southern California
Don Breazeale Don Breazeale & Associates
Kerry Cartwright Port of Long Beach
Julie Anna Cirillo Federal Highway Administration
Cynthia Cory CA Farm Bureau Federation
Larry Dahms Metropolitan Transportation Commission
Rosalind Daniels Sonoma County
Phil Depoian Los Angeles International Airport
Rod Diridon International Institute for Surface Trans. Policy Studies
Phil Dow Rural Counties Task Force
John D. Dunlap III Air Resources Board
Ed Gerber California Transit Association
Avis Gibson United Parcel Service
John Glover Port of Oakland
Arthur Goodwin Port of Los Angeles
Carl Guardino Santa Clara Manufacturers Group
Allan Hendrix Caltrans
Mike Howard California Highway Patrol
Vernon Johnson Inter-Tribal Council
John Jolliffe Casas International Brokerage
Edward Jordan California Transportation Commission
Adib Kanifani Institute of Transportation Studies
Tom Larwin San Diego MTDB
Kirk Lindsey California Trucking Association
Art Lloyd Peninsula Corridor Joint Powers Board
John Martin San Francisco International Airport
Paul Nowicki Burlington Northern Santa Fe Railroad
Michael Ongerth Union Pacific Railroad
Mark Pisano Southern California Association of Governments
Andrew Poat Caltrans
Robert Ratcliff California Alliance for Advanced Trans. Systems
Steven Rhoads California Energy Commission
Terry Roberts City of Oakland
Ken Ryan Sierra Club
Rusty Selix Calif. Association of Councils of Government
Jack Stewart California Manufacturers Association
Ken Sulzer San Diego Association of Governments
James van Loben Sels Caltrans
Carl Williams Business Transportation & Housing Agency

TRANSPORTATION ASSESSMENT STEERING COMMITTEE (TASC)

TASC was formed by Caltrans to engage in detailed discussions of how this transportation system performance measurement framework should be developed and what its constituent parts should be. The committee met periodically for approximately one year to define terminology, identify system outcomes, indicators, measures and linkages to decision making. With the diversity and size of this committee, many suggestions and opinions could not be incorporated into this report. Nonetheless, the work of the committee was of tremendous value in this effort. And while the committee's role in the development of performance measures has been vital, responsibility for this report and any shortcomings it may have rest with Caltrans' project staff.

Gerald Bare, Caltrans District 7 - Los Angeles
Ken Beard, Modesto & Empire Traction Company

Carol Boland, Caltrans District 11 - San Diego
Al Bowser, Automobile Club of Southern California
Emily Burstein, Caltrans Rail
Sara Chesebro, Caltrans District 5 - San Luis Obispo
Joy Dahlgren, University of California Berkeley
Zahi Faranesh, Caltrans District 7 - Los Angeles
Cathy Felkins, Caltrans District 3 - Marysville
Blesilda Gebreyesus, Caltrans District 4 - Oakland
Steve Gregory, Port of Oakland
Bill Haas, Federal Highway Administration
Garth Hopkins, Caltrans Aeronautics
Douglas Ito, San Joaquin Council of Governments
John James, Caltrans Mass Transportation
Lisa Klein, Metropolitan Transportation Commission
Arthur Lloyd, Peninsula Joint Powers Board
Lynne March, Caltrans New Technology and Research
Pat Mickelson, Caltrans Aeronautics
Ron Peterson, Fresno Council of Governments
Stan Randolph, California Trucking Association
Jay Riley, Caltrans New Technology and Research
Ty Schuiling, San Bernardino Area Governments
Dennis Scovill, Federal Highway Administration
David Tannehill, Metropolitan Transportation Commission
Bob Triboli, Caltrans OPEA
Linda Turnquist, Caltrans Planning

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APPENDIX E
SUMMARIZED WRITTEN COMMENTS & RESPONSES

Listed below is a summary of written comments received in response to the Transportation System Performance Measures Draft Report. An attempt was made to represent main points. Responses for many of the comments are provided by Caltrans. The many comments regarding suggested modifications to particular measures, indicators or outcomes will be fully considered as Caltrans continues to work with its partners to develop the performance measures framework and its details.

COMMENTS RESPONSE
California Highway Patrol - Captain Ron Newton
· Several comments regarding the accuracy and consistency of cited travel and safety statistics.

All figures used have been checked for accuracy and consistency.
Santa Barbara County Association of Governments, Michael Powers, Deputy Director
· Concerned with emphasis of modeled versus monitored data and burden that could put on smaller agencies.
· Need to address PM development work done by Comsis Corp. in response to AB 3093 and PM work done by congestion management agencies.
· Over-reliance on model data not prudent because of equity and coverage of modeling.

· Will CT be using data from the American Community Survey to follow 2000 Census?
· Reliability indicator: not sure if TASAS and PTMS can adequately address goods movement and long distance commuters.
· Cost Effectiveness: small improvements in mobility/accessibility, when aggregated, are likely to exaggerate the real benefits of minor improvements.
· Equity: TDA unmet transit need process and welfare to work relate to autoless population. Sustainability relates to impact of transportation costs on economically disadvantaged.

Caltrans recognizes the limits of models and forecasts. It is our intention that monitoring, modeling and forecasting would each be used as appropriate. Additionally, opportunities to use the many other available data sources will be examined. The details will be determined in subsequent phases in the continued development of this framework. Whenever possible, it is our intention to avoid new data collection requirements. It is expected that as intelligent transportation systems and related technologies are implemented, improved data sources and analysis capabilities will become available.
Sacramento Metropolitan Air Quality Management District, Norm Covell, Air Pollution Control Officer
· Could not find explicit references to air quality and air quality in transportation planning and decision making. Address this in order to maintain consistency with the State Implementation Plan.

Air quality is an important PM issue. Under the Environmental Quality Outcome, attainment of air quality standards is addressed. When the framework is more fully developed in subsequent phases, attention to air quality will be more apparent.
San Bernardino Associated Governments, Norman King, Executive Director
· Strengthen GM focus to look at mobility and equity for both people and goods.
· PM should also be applied within the GM module.
· Situation of goods being from or going to California more valuable to our economy than goods simply passing through.

In looking at the transportation "system," the movement of goods is considered to be an essential component. As the framework matures, the ability to look at market segments such as goods movement will improve.
Sacramento Area Council of Governments, Bruce Griesenbeck, Senior Transportation Analyst
There are no new requirements for monitoring or analysis by any agency, and no adverse funding outcomes or penalties for any agency which is not consistent with the Plan. The Plan must include an explicit statement to this effect. If such a statement cannot be added to the Plan, we have serious concerns about the Plan effort.
· Some measures apply only to one mode, and other measures are different for different modes.
· Travel Time: "Point-to-point" rather than "door-to-door" times should be used. Use statistical measurement for monitoring. Since the costs of monitoring travel time vary widely according to the measurement methods, and desired levels of accuracy and significance, address this subject directly in the Plan. Provide more detail about the MTC monitoring proposal. Model-estimated travel times are not equivalent to monitored travel times. Models should be treated as forecasting tools, not "data" tools.

· Delay (or Lost Time): In theory this measure is very good. But it requires further definition of "optimal" times, which differ by trip. What constitutes optimal time, and how to determine it?

· Reliability: Appropriate only as a monitoring measure. Discuss how monitoring only measures should be treated in the planning process.

· Cost Effectiveness: Workable only as a means of comparing alternatives. Some planning efforts (notably regional plans) do not go through rigorous alternatives analysis, while corridor studies or MIS's do. The definition of costs and a consistent method of developing cost estimates, should be included.

· Final Demand: No measure should rely on any specific vendor product or a single software package. Agencies have limited resources for acquiring new software, training staff, developing consensus among users as to the

reliability of the software, and then using it for transportation planning. There may be even less consensus among professionals, let alone policy makers, as to the reliability of economic forecasting models, than there is for travel demand models.

· Accident and Crime Rates: Forecasting accident rates is indeed very difficult. Do not included this unless there is a reasonable method for doing this.

· Especially for corridor studies, the number of travel options for a defined set of typical trip interchanges is a useful measure. Hard to define "viable options."

It is the intention that this PM framework will be used. It is also expected that some of its findings will be incorporated into the STIP guidelines, currently scheduled for completion in December 1998.

Agreed, not all measures apply equally to all modes. Different priorities will apply depending on the issue being considered by the decision making body.

We will further examine the measurement of travel time.

We too doubt that reliability can be forecasted. Measures that are strictly for monitoring purposes are expected to inform decision makers as to how past decisions have actually worked. The decision makers can then make a more informed intuitive judgment as to how the pending decision might best be made.

Each measure and outcome will be applied by the decision makers as they find appropriate.

We recognize that agencies have limited resources. This is being taken into consideration as the framework is being developed.

We do not expect to forecast accident and crime rates, monitoring only.

City of Tustin, Elizabeth Binsack, Community Development Director
· General agreement with Plan policies, goals, objectives and actions.

California Western Railroad, Gary Milliman, President
· The railroad should either become a part of the State supported transit system, or the Transportation System PM study should recommend that the passenger service be fully deregulated through legislative action.
· Numerous other points on how the State should deal with shortline railroads and this railroad in particular.

It is beyond the scope of the PM framework development effort to make such policy recommendations. The comments will be forwarded to the Caltrans Rail Program. However, the "system" approach of this framework would eventually enable the gathering of data that could be used in analyzing such policy questions. However, the framework would not determine the course of action; that would be determined by the responsible party.
Contra Costa County Community Development Department, Daniel Pulon, Senior Transportation Planner
· How is the monitoring component consistent with State congestion monitoring requirements?
· As an owner operator, the State should be responsible for monitoring State Highways, consistent with the Congestion Management Statue.
· Diagram describing the IIP would be appropriate.
· Will local governments have a role in decision making process for investments in State Highways affecting them?

Starting in Phase Two, Caltrans will focus on how congestion management agencies are gathering and reporting

congestion monitoring data, and will strive to make the best use of these efforts.

The roles of decision makers will not change due to performance measures. What changes is the amount and quality of the information available and a consistent approach.

San Diego Association of Governments, Kenneth Sulzer, Executive Director, George Franck

· This process of developing performance measures, applying them in a limited way, refining them and then applying them state-wide is well thought out and should be productive.
· Performance measures should be limited to the smallest number possible.
· Decision-makers should be presented clearly defined alternatives, with quantified costs and benefits. Quantifying a dozen or more performance measures, particularly when they have similar impacts, does not help the decision-making process. Two or three measures, which portray the real differences between alternatives are far more helpful.
· Measures should be based on direct data, not derived information.
· Measures that are useful in measuring the performance of the existing system may not be as useful in making decisions on future projects.
· Accident rates, are very useful in measuring the performance of the existing system. Difficult to forecast safety.
· Sustainability does not provide a useful measure in evaluating the performance of the existing system. It is important, however, in selecting alternatives.

The set of outcomes that are being proposed were developed in consultation with various advisory groups. As measures and indicators are further developed the advisory groups may conclude that some outcomes are not appropriate. However, at this time, we will continue to develop measures and indicators for each of the nine outcomes.

We seek forecasted, modeled and monitored data as appropriate. This information will be used as decision makers prioritize their needs for actual decisions.

Do not anticipate forecasting safety issues.

Automobile Club of Southern California, Dan Beal, Public Affairs

· Should allow local and regional agencies the flexibility to tailor policies, recommendations, and implementation actions.
· PM should not consume excessive resources or be an end in itself.
· Maintain a continuous dialogue with stakeholders.
· There is a lack of adequate funding for transportation purposes. Should encourage a plan and strategy to close funding gaps. New funding sources need to be developed for freight needs.
· The safe movement of freight on highways and roads is a significant concern, particularly in regards to increasing size and weight of longer combination vehicles.

It is the intent of this effort to enable and increase flexibility of local and regional agencies. These agencies will be prioritizing the outcomes that are important to their jurisdictions for the decisions at hand. As Caltrans continues to develop and add detail to the framework, we will continue to involve stakeholders and expand that involvement. While the framework development effort is not in a position to advocate increased funding, application of performance measures could be used to show the need for increased funding for specific issues. Within the Safety Outcome, we will consider the development of freight movement related safety indicators.

County of Modoc, Thomas Tracy, Road Commissioner/Director

· Need to assign different weights to the outcomes and measures to address variations throughout the state.
· Make use of existing pavement management systems.
· Household travel costs aren't relevant to system preservation.

· As the system deteriorates, household travel costs may go down because people can't travel as much, though they want to.
· Absolute numbers should be used in measuring safety, not just rate changes.
· Provide for variation in jurisdiction size and other characteristics; emphasize system preservation and safety.

As the framework is further developed, we will be striving to make the outcomes and measures flexible so that regional entities can set their own priorities as to how important different aspects are within their decision making.

Caltrans recognizes variations in jurisdiction sizes and the differing abilities to address this matter. In fully designing the framework, we will take this into account.

As the indicators and measures are further developed, we will try to be aware of agency limitations and make adjustments accordingly.
Metropolitan Transportation Commission, Lawrence Dahms, Executive Director
· Supports system performance measures.
· Endorse focus on multimodal measures and outcomes from customer perspective.
· Supports linking PM to decision making process so it retains regional authority and regional determination of relative outcome priority.
· Some decisions will be outside PM framework.
· Phase IV - Full Deployment should acknowledge varied priorities and modeling capabilities.
· In many cases, no need to set up new criteria that overturn well-established regional processes.
· Supportive of partnerships, under the condition that regions are not required to take on new data collection or reporting burdens.
· Caltrans has eliminated its congestion monitoring program at the same time we're developing system measures that require monitoring.
· Forecast timing: State performance measures should be consistent with Federal air quality conformity requirements.
· Performance standards are useful only if a) they relate directly to outcomes; b) identify actions that help achieve the standard; c) the accountable agency has authority to take a correctable action.
· How will PM support decision making where system management and operational investments will play an increasing role as compared to large capital investments?
· Deferring detailed measure comments until these are more fully developed.
· The Equity measure is inadequate, allow flexibility in this measure.
· Lacking measure of commitment to sustaining transportation operations in the urban core, particularly transit.
· More thorough analysis of how measures may be applied at different stages of planning process: a) monitoring system performance; b) estimating performance of programs; c) estimating performance of projects; d) evaluating completed investments.
· How monitoring may be used to evaluate completed projects. PM may be insufficient to evaluate complex multi-year projects.
· More narrow definition of measures. For example: household resources does not relate to any correctable action for an MPO; nor is it clear what desired outcome is being captured.
· Market segmentation should be considered for other outcomes in addition to travel time.

We acknowledge that there will be varying priorities in applying PM and in choosing which tools (monitoring, modeling and forecasting) to use under each circumstance.

We will continue to try to avoid new reporting burdens.

It is expected that air quality measures will reflect each jurisdiction's efforts at attaining conformity with Federal requirements.

Even if a jurisdiction cannot directly affect an outcome, it may be valuable for decision makers to understand how a situation is changing. It will be the decision makers' discretion as to which outcomes apply.

It is expected that PM will be of use in making all sorts of transportation investment decisions including operational, maintenance and facility expansion.

Equity is one of the most difficult outcomes to address. Further work on this will occur in subsequent phases.

PM should apply statewide. If investment is inadequate in urban core areas or transit, PM could help to show this point and provide decision makers with information that can be used to support policy and investment changes. The PM are intended to be neutral information tools.

Application of PM will be at the discretion of decision makers. However, it is expected to be a very rare situation where none of the outcomes or measure apply to a complex project. Still, it is understood that decision making is a political process and that the political process is primary in decision making.

Metropolitan Transit Development Board, William Lieberman, Director of Planning and Operations
· PM approach sound. System outcome focus is commendable.
· Does not address the connection between transportation and land use. Suggested language to include in revised report: " Land Use Coordination; ensuring that transportation facilities and urban development are planned in concert to promote compact patterns of growth."

The topic of the land use/ transportation connection was frequently raised by the advisory committees. As the framework is further developed, we will try to address a method of examining or measuring land use and transportation.

San Francisco County Transportation Authority, Jose Luis Moscovich, Director of Plans & Programs
· Support PM effort. Agree that State and regions should coordinate efforts.
· Current funding levels inadequate to support even the most basic level of performance monitoring.
· Identify PM which are cost-effective and State commit additional resources for PM, making them available to CT and regions.
· Travel Time: monitor actual travel times by mode and corridor.
· Delay: limited ability to gather data for other than highways.
· Access: reword as follows, "The fundamental purpose of the transportation system is to provide opportunities to physically reach or access desired locations. From a user perspective, the term 'desired location' covers a wide spectrum of socio-economic needs and desires including work, education, health care, and recreation. Transportation plays a large, but not the only, role in providing access to these opportunities."
· Access defined in terms of a maximum travel time. Calculate separately for transit and auto.
· Reliability: acknowledge that transit reliability is also affected by non-recurrent traffic-related delays and not just maintenance.
· Cost Effectiveness Ratios: measure is project specific.
· Customer Satisfaction Index: can be monitored but not forecast.
· Economic well-being: final demand is difficult to tie to specific problems and needed improvements. Time consuming and resource intensive to measure. Instead, measure travel time and delay for key freight corridors and travel time delay and household transportation costs for key commute corridors.
· Sustainability: use Household Transportation Costs as an Economic well-being measure. Focus on ability to maintain system over time and life time environmental benefits/impacts. Life cycle operation and maintenance cost.
· Environmental Quality: restate conformity positively.
· Safety & Security: Accident and Crime Rates have separate measures for each.

· Equity: better measures are 'Income Group Share of Travel Time Benefits' and Income Group Share of Access to Desired Locations.'

In the development of PM, we are strongly attempting to avoid the creation of new burdensome reporting activities.

The suggestion for redefining access will be considered within the context of the advisory committees.

The setting of maximum and minimum acceptable travel times would not be a task of PM. The setting of such standards would be at the discretion of the applicable decision making body.

Yes, all modes are subject to non-recurrent delays.

Cost-effectiveness may also be applicable to strategy comparison. Application will depend on individual circumstances.

Customer satisfaction is not expected to be forecast.

In the proof of concept phase, we will do further work on improving our ability to look at economic well-being.

With sustainability, we recognize that there are different ways of looking at it. There may be several measures that each examine an aspect of it.

Like sustainability, equity is a difficult outcome to measure. We will be doing further work on this.

Alameda County Congestion Management Agency, Jean Hart, Deputy Director
· Survey congestion management agencies throughout CA on how they are complying with State PM requirements.
· Concurs with consumer orientation.
· Forecast data is viewed with skepticism when used to determine how system is performing. Useful tool to determine benefits of future investments.
· Paramount to use existing data in order to contain costs.

The subsequent framework development phases will include an examination of the work being done by the congestion management agencies.

Caltrans recognizes the limits of models and forecasts. We will attempt to apply them appropriately within the framework.

Wherever possible, we are attempting to use existing data.
Sierra Club, Kenneth Ryan, Transportation Issues Chair
· Appears to emphasize engineering efficiency rather than socially effective solutions.
· Fine document for setting agenda for future work by Caltrans.
· Seriously flawed in that it is silent on local community impacts of trans. projects. Measures need to be developed under responsibility - sustainability.
· Access: to desired locations seems wrong. People want access to activities. Can a given set of activities at a location be accessed in a variety of ways? What services actually come to the locations of the activities? Monitor and forecast both.
· Confused by cost effectiveness discussion.
· Household transportation costs must include purchase and operating costs plus local infrastructure &

emergency services for transportation users.
· Equity: benefit in time savings by income group will result in ripping through low income communities for benefit of suburbs.
· Need to acknowledge costs incurred by private individuals and enterprises.

It is our intention that the outcomes, indicators and measures will be neutral in their use and not be applicable to only one sort of solution. Actual application of the measures will be the greatest determinant of what solutions are considered.
Sustainability is an area that we are considering for application to the community impacts questions. We will work with our advisory committees to further examine this matter.
At this point we only have confidence that we can examine access to locations. However, we recognize that access can be provided by other means, particularly through telecommunications.
The household costs was intended to include purchase and operating costs. The infrastructure and emergency costs would probably come under a system sustainability measure.
When we conduct proof of concept testing on the equity measure, we will look to see that it does not unfairly favor one income or other group over another.
California Air Resources Board, Lynn Terry, Deputy Executive Officer
· Supports effort to identify and use PM.
· Quantification of PM should be fairly and evenly applied to all modes.
· Consider balance in the provision and availability of all modes as part of accessibility.
· A measure of air pollutant emissions reductions should be included in cost-effectiveness - project cost-effectiveness in dollars per ton of emissions reduced.
It is the intent that PM would be applicable to all modes. Prioritizing of the outcomes and measures will be left to the responsible agency. As the measures are fully developed, we will further identify cost-effectiveness such that air quality and other factors can be examined.
Contra Costa Transportation Authority, Brad Beck, Senior Transportation Planner
· Candidate measures for economic well-being may not be adequate.
· Not clear how final demand relates to state's economic well-being. Not useful for individual projects.
· Household transportation costs not sufficient to measure sustainability. Costs also go up for food, clothing and other goods.
· Sustainability can be either ability to physically maintain the system or sustain acceptable environmental quality. Study focuses on the system. Look at long-term costs - direct and indirect including private sector.
· More detail on implementation, particularly monitoring costs. Will there be commitment for the ambitious monitoring as outlined?
There are several outcomes which have proven to be difficult to measure. We will continue to refine and seek advice regarding the improvement of the measures. Sustainability is one of the most difficult to approach.
Resources for implementing the framework have not yet been identified. Until we better understand what will be implemented and what that will entail, it is difficult to engage in a resource allocation discussion. But, it is an intent of this effort to rely on existing information to the greatest extent possible.
Port of Long Beach, Geraldine Knatz, Director of Planning
· More discussion needed on how PM will be implemented. Discuss non-urban/rural areas.
· Measure reduced travel time on key goods movement facilities.
· More discussion on defining the dollar value of benefits.
· Define how to forecast customer satisfaction.
· Important to estimate the economic benefits of goods movement improvements.
· Questionable to forecast safety. Attempting to measure levels of safety amongst various alternatives and modes is inappropriate.

More implementation detail will be provided as the framework is further developed. PM are expected to apply in rural areas as well, though the rural agencies may place greater emphasis on some of the outcomes and measures as compared to urban area choices.

We will not attempt to directly forecast customer satisfaction. That is expected to be a monitoring activity. However, some have suggested that measuring acceleration and deceleration could indicate traveler stress levels and thus be used to partially show customer satisfaction.

We do not anticipate forecasting safety.
· Los Angeles County Metropolitan Transportation Authority, James de la Loza, Executive Officer
· Integrate with other state transportation plans.
· Supports continuing and evolutionary process in developing PM and encourages wider participation of implementing agencies.
· Clarify that decision making at the regional level will remain at the discretion of regional agencies and county transportation commissions/ authorities.
· PM should also apply to inter-regional programming decisions.
· Report should state it is advisory.
· MTA does not support developing a uniform statewide set of mandatory PM and cannot support the proposed outcomes, indicators and measures if they're intended as mandates.
· Reduce the number of outcomes, indicators and measures as current list is complex and unwieldy.
· Regional and county agencies should develop PM that are responsive to their individual needs.
· The survey of regional agency PM was too limited and the report recommendations appear biased toward those, not reflecting a statewide consensus. Should commit to comprehensive review of all regional and county agencies.
· Report should show how the conference results are reflected.
· Implementation section not clear.
· Recommend that CT test PM on the inter-regional road system and also fund regional/county demonstration projects. MTA volunteers to participate in such a pilot.
· Concerns with model and forecasted rather than monitored data.
· Exhibit 2-1 should show that factors other than PM influence decisions.
· CT needs to dedicate funding for forecasting development and monitoring to ensure reliability and accuracy.
· PM are not limited to the three types identified in report. There's also regional, sub-regional and corridor.
· Some of the highly subjective measures may be more appropriately addressed through planning policies.
· More details regarding the measures are needed.
· Travel Time: need break down of components.
· Delay: will not apply well to exclusive right of way modes.

As we further develop PM we will seek consistency with other State plans.

Decision making at the regional level will remain at the discretion of regional agencies. PM simply seeks to better inform those decisions.

PM are expected to also apply to the inter-regional decisions.

The particular outcomes were determined in large part with the help of advisory committees. At this time we will continue to try to develop indicators and measures for each of the nine outcomes.

Regions and counties are welcome to develop additional measures that meet their needs.

As the framework development effort continues, we will conduct a thorough review and analysis of the many individual regional and county PM efforts in California.

The State intends to apply PM to the inter-regional road system. We will examine the feasibility of conducting regional pilot projects.

We understand that PM will not be the only factors used in decision making. The political process is primary,

with PM being applied within that process.

As subsequent phases are undertaken, further detail will be provided regarding each of the indicators and measures.

Even exclusive right of way corridors are subject to non-recurrent delay due to accidents, equipment breakdowns and other events. We expect that delay will be applicable across all modes, though not in all situations.

California Transit Association, Edward Gerber
· It would be very helpful if the Report more fully sketched the relationship between performance measures and our ability to determine the need for investments in improvements to the transportation infrastructure. We believe that California is substantially under-investing in needed transportation infrastructure, particularly in the context of projected population and economic growth over the next 25 years.
It is expected that the application of performance measures will enable someone to examine the need for additional infrastructure investment or operational improvements. The interested party could look at how a particular outcome is improving or deteriorating over time given different investment approaches. The specific relationship between the measures and the issue being examined would vary with each instance. It is something that will be examined more thoroughly in Phase II.
Southern California Association of Governments, Regional Council
· At its May 7, 1998 meeting, the Regional Council voted to recommend that Caltrans include essentially all of SCAG PM approach and to include SCAG's goods movement performance measures as well. Substantial written documentation was provided.
During Phase II of the performance measures framework development, Caltrans will give close consideration to the entirety of SCAG's performance measures approach and examine where additional components of the SCAG approach could benefit the developing Caltrans framework.

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APPENDIX F
PROOF OF CONCEPT TESTING

Proof of concept testing was conducted on the Reliability Outcome to assess whether the performance measurement framework approach can produce useful information. The results of the testing are contained on the following pages. Facing pages illustrate the textual discussion. Further testing is proposed for each of the outcomes during Phase II.

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APPENDIX G - EXCERPTS FROM THE PERFORMANCE MEASURES CONFERENCE REPORT

The UCLA Extension Public Policy Program and the University of California Transportation Center, on behalf of the California Department of Transportation (Caltrans), Transportation System Information Program, convened a two day conference entitled Performance Measures for California Transportation System Users and Investors. The conference was held at the Sacramento Convention Center on October 6-7, 1997 and brought together nearly two hundred state, regional and local government representatives as well as private interest groups and researchers interested in the future of performance measures in California.

The purpose of this conference was to help Caltrans develop a set of intermodal system-level transportation performance indicators that will become a part of the ongoing planning, management, resource allocation, and policy-making process for transportation in California. The conference was one part of Caltrans' continuing process of identifying, developing and implementing performance measures.

The specific goals of the conference were as follows:

· To build a common frame of knowledge and language for addressing the process of discovering, developing and implementing a transportation performance measure system for California.
· To learn first hand about experience with the process of developing and implementing transportation performance measures at the national, state and regional levels from experts in the field.
· To understand how performance measures can improve policy formulation and decision making in the complex politically-charged world of transportation resource allocation.
· To help Caltrans develop a set of intermodal system-level transportation performance indicators that will become a part of the ongoing planning, management, and policy making process for transportation in California.

The first day of the conference aided in the building of a common language. The speakers included representatives from various levels of government that had implemented performance measures, as well as academics and experts in the field of performance measures. The second day began with a summary of the key points before dividing the participants into five workshops to facilitate discussions on specific issues related to performance measures. The conference concluded with a sharing of insights from the workshops and a panel discussion addressing how the information from the conference will fit into the transportation planning, policy making, funding and management processes.

On the first day of the conference, Howard Mischel, Senior Vice President and Director of Municipal Research at Massachusetts Financial Services discussed the applicability of performance measures to the private sector's investment decision process. As California and other states, in response to funding shortfalls, begin to consider private partnerships and alternative financing for needed transportation improvements, the opinion of private investors becomes an important consideration. According to Mr. Mischel, there are a wide variety of factors which are part of the investment decision process for analysts and portfolio managers, performance indicators being only one. Performance indicators which give insight into long-term credit quality and viability of a transportation enterprise or infer something about management capabilities are of greatest value. In particular, this includes measures that indicate future demand/utilization for a facility or system, revenue/expense interrelationships and profitability, and the status of the capital planning/budget processes. Other indicators, such as those relating to safety issues and work quality are at a level of detail that investment professionals generally don't approach. Caltrans and the regional agencies should consider this emphasis in their performance indicator design process as the future will likely hold increased private partnerships in transportation

investment.

In the final panel of the conference, six stakeholders from various California transportation agencies and interest groups all raised important points with regard to the future of the design, development and implementation of performance measures in California. John Barna, Deputy Secretary of Transportation for the California Business, Transportation and Housing Agency, and Pete Hathaway of the California Transportation Commission both
emphasized that SB45 brings new opportunities for using performance measures to evaluate potential projects in California at both the regional and state level. Rusty Selix of the California Association of Councils of Governments added that SB45 also creates the dynamic for making intermodal decisions and the need for measuring intermodal value. This flexibility underlines the need for performance measures to aid in this decision making and value measurement now more than ever. Mr. Selix also noted that SB45 emphasizes the need for accountability in project selection and Stan Randolph of the California Trucking Association suggested that performance measures could be developed into project selection criteria so that projects that improve the ability to move freight are duly credited.

Mr. Selix reiterated that Caltrans is really just embarking on the performance measures process, but that as California continues to face the pressures of rising population and limited land and monetary resources, the performance measures process will by necessity rise to the challenges. He added that the performance measurement process is the key to unlocking institutional and ignorance barriers and starting towards better transportation investment decisions in California. Kenneth Ryan of the Sierra Club added that Caltrans has the people, the process, the connections and the brain power to unite all of the players and create these effective new decision making tools. However, despite their abundant resources, he predicted that the process will not be easy for Caltrans. Andrew Poat emphasized that a shift in the culture of Caltrans to focus on the system users, rather than the vehicles they operate, will be a significant and necessary outcome of the process.

Despite much concern among participating representatives of local and regional agencies that their priorities might be overlooked and that performance measurement might burden them with new requirements, there was a consensus that Caltrans faces quite a challenge in the coming years. The final panel, though comprised of various interests, generally agreed that performance measures can improve transportation decision making in California, provided that the process includes the stakeholders and the system users. Most conference participants were confident that an inclusive and patient process, of which this conference is only a part, will allow Caltrans to develop a useful, informative, customer oriented set of performance indicators for California.


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